NOV 16 1944

ENGINEERING NEWS-RECORD

NOVEMBER 16, 1944

Laying a 12-in. slab for runways to take bomber and transport super-loads at Lindbergh Field, San Diego, Calif.

This Issue:

VENTILATING SYSTEM FOR ROAD TUNNELS

DESIGN FEATURES OF [illegible] DAM

THAT BRIDGE OF TOMORROW CAN BE *planned* TODAY

As a highway or municipal engineer you have a double responsibility. Not only will you want to make your plans to provide jobs for returning service men and war workers, but these plans must fit a postwar world, the pattern of which is not yet clear.

You can find a practical answer to your postwar bridge problems on both of these counts by specifying ARMCO Multi Plate Pipe and Arches. This way you get a strong, durable, basic structure that can be easily installed by unskilled labor. At the same time you assure a flexibility in design and appearance that will enable you to conform to postwar standards. With ARMCO Multi Plate to support the load you can finish the bridge with any type of design and material you choose.

Other advantages include ease of transportation, quick assembly on the job site without special equipment, and freedom from maintenance.

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JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

Vol. 133 NOVEMBER 16, 1944 No. 20

COMING NEXT

• Photogrammetry finds application in many fields, the most prominent of which is compilation of maps from aerial photographs. It is likely that the experience gained in this war will be made available in peacetimes for furthering the advance of aerial mapping to the advantage of the engineering profession. The first of two articles on "Fundamentals of Photogrammetric Engineering" will appear in the Nov. 30 issue.

• Speed in placing concrete was the primary objective in the planning and construction of Fontana Dam (see p. 97 of this issue for design story). Plant facilities to meet a concrete placing schedule of 200,000 cu. yd. per month was necessary. To meet this demand hammerhead cranes, belt conveyors, a specially designed 4-cu. yd. dump-bucket, and special constructed material boxes were all brought into play to speed-up the operation. That 2,800,000 cu. yd. was placed in about 20 months is a record worthy of note.

• Recent tests on a 12-ft. dia. model indicates that construction of a 300-ft. dia. building without interior columns, and with a roof of 22-gage steel sheets supported by air pressure of 20 psf. is feasible. See *ENR*, Nov. 30 issue.

LOOKING AHEAD

• Hidden pockets in floor, wall, partition and roof construction of buildings commonly found in the explosive industry have been the source of considerable trouble—sometimes causing disasters. In an early issue, three designs adaptable for small timber structures to overcome the hazard of inflammable or gaseous atmospheres will be described.

• Scheduled for an early issue is another thought provoking article on the use of graphics in structural design by D. B. Steinman, well-known consulting engineer. Mr. Steinman discusses the advantages to be derived from the symmetry of a structure to reduce calculations to a minimum. By using the concept of symmetrical and anti-symmetrical loading, the analysis of monolithic structures is considerably reduced.

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CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
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Director of Circulation:
Please change my address on Engineering News-Record

From .....

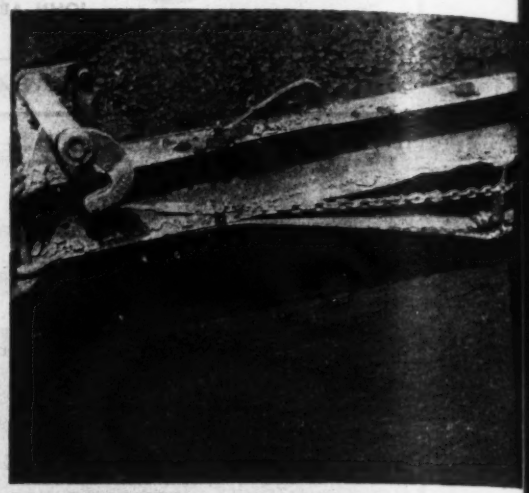
To .....

Signed .....

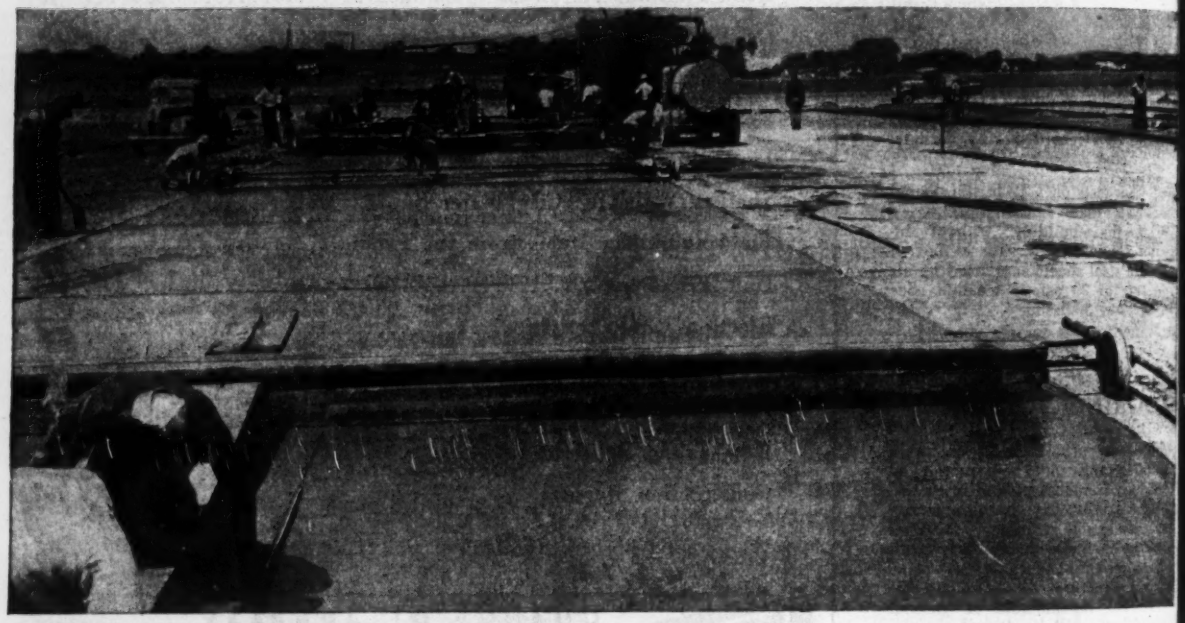
Paving at an Army Airport...

PICTURES ILLUSTRATE THREE ADVANTAGES OF ATLAS DURAPLASTIC
THE AIR-ENTRAINING CEMENT ORIGINATED AND DEVELOPED BY UNIVERSAL ATLAS

FREEDOM FROM SEGREGATION of concrete made with Duraplastic cement shown by steep rounded edges of concrete just after dumping from paver bucket.



PLASTICITY: Concrete after first and only pass of finishing machine indicates plasticity imparted by Duraplastic cement.



ABSENCE OF BLEEDING or "water-gain" of Duraplastic concrete permits completing all finishing operations closer to paver. This is especially important when concreting is stopped at end of a day's run.

ATLAS DURAPLASTIC

Air-Entraining Portland Cement

A Universal Atlas Product

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ENR-D-10

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • NOVEMBER 16, 1944 • VOLUME 133 • NUMBER 20

Differences are reconciled in Missouri River plans

Representatives of Corps of Engineers and Bureau of Reclamation bring separate reservoir proposals into agreement for Congressional consideration.

Engineering differences between the Army Engineer plan and the Bureau of Reclamation plan for development of the Missouri River (*ENR* May 25, vol. p. 769) were ironed out Oct. 16 and 17 in a conference at Omaha, Neb., between representatives of the two agencies. A joint report on the conclusions was issued Nov. 8 and signed for the Corps of Engineers by Brig. Gen. R. C. Crawford, division engineer, Omaha, and Gail A. Hathaway, head engineer, Office of the Chief of Engineers; and for the Bureau of Reclamation by W. G. Sloan, assistant regional director, Billings, Mont., and John R. Riter, acting director, Branch of Project Planning, Denver.

Actual changes to bring about conciliation of the plans now before Congress were relatively few. For purposes of discussion the Missouri River Basin was divided into six subdivisions. In three of these, (1) the upper Missouri, (2) minor western tributaries, and (3) lower Missouri, there were no points of conflict in the engineering features of the two plans. The Yellowstone River Basin is to be developed in accordance with the plans set forth in Senate Document No. 191 of the present session of Congress, which is the Bureau of Reclamation plan, involving 27 small reservoirs, rather than with those outlined in House Document No. 475, the Army plan, which required only two fair-sized reservoirs.

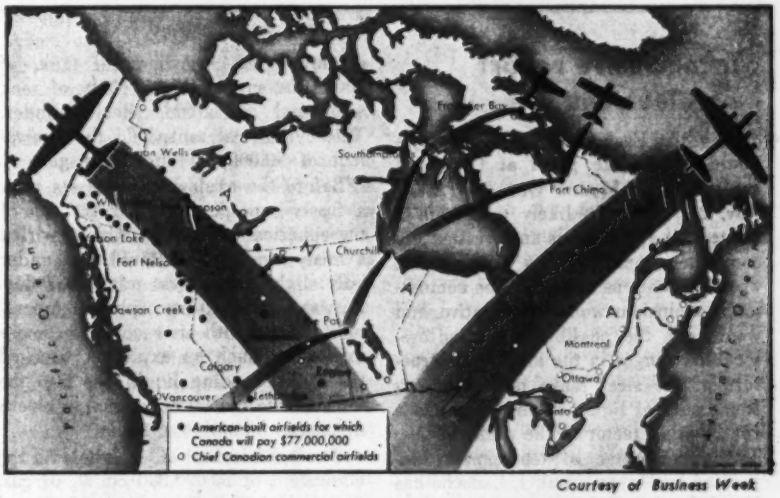
In the fourth subdivision—Missouri River from Fort Peck to Sioux City—the Army had proposed 5 reservoirs with total storage of about 35 million acre-feet, and the Bureau of Reclamation 3 reservoirs of about 25 million acre-feet capacity. The adjusted plan contains 5 reservoirs totaling 42 million acre-feet, and includes the Army's largest storage, Garrison reservoir, of 17 million acre feet and the bureau's largest storage, Oahe reservoir, of 19.6 million acre feet. The final subdivision, which covers the three tributaries, Niobrara, Platt and Kansas, had 9 reservoirs in the Army plan and 22 in that of Reclamation Bureau. Adjustments were required in only three storage sites.

Water question not decided

Nothing is said in the report about the allocation of water as between navigation, flood control, power, irrigation and other uses, it being understood that this awaits further study. Nor is any consideration given as to which dams will be built by which agency.

In transmitting the joint report to the Secretary of War and the Secretary of the Interior, Maj. Gen. Eugene Reybold, Chief of Engineers, and Harry W. Bashore, Commissioner of Reclamation, expressed the view that it sets forth the "best practical plan for the development of the Missouri River Basin for navigation, flood control, irrigation, reclamation, power and all other beneficial uses of its waters." They pointed out that the agreement was brought about by recognizing that the Corps of Engineers should have the responsibility for determining reservoir capacities for flood control and navigation and the Bureau of Reclamation the same responsibility for irrigation; also that both agencies recognized the importance of the fullest development of the hydro-electric power in the basin consistent with the other beneficial uses of water.

The report is now made available for Congress in its consideration of the Flood Control and River and Harbors bills, H. R. 4485 and 3961, as well as of the bill covering the Reclamation Bureau's Missouri River proposals, S. 1915.



Courtesy of Business Week

Canada takes over U. S.-built airports in Dominion

Airports in Canada built by the United States on supply routes to Britain and the Soviet Union, at a cost of $90,683,000 (American), will be taken over by the Dominion Government. The U. S. will be reimbursed $76,811,500, the estimated value of the 40 airfields and the telephone line from Edmonton to the Alaska border. Canada spent an additional $31,600,000 on similar facilities under an agreement that it would be repaid by the U. S. Instead, to assure internal ownership of all vital air facilities the Canadians will reimburse the U. S. for the value of the permanent installations.

Extensive sanitation programs win approval in California elections

San Francisco voters pass $12 million bond issue for sewer construction and East Bay cities will form a sanitation district

Acting under heavy pressure from state and local health authorities, seven cities and towns of the San Francisco (Calif.) Bay region, including the city of San Francisco, voted approval at the Nov. 7 election of extensive sanitation programs for the early future or immediate postwar period.

San Francisco's long-discussed plans for replacing its inadequate and antiquated sewage facilities with modern treatment plants and pumping stations, together with new trunk sewers, (*ENR*, Sept. 4, vol. p. 325) took tangible form when the voters approved a $12,000,000 bond issue for sewer construction and repairs.

Passage of the bond issue proved significant from a viewpoint other than that of sanitation in that it provides the city with its first sizeable fund for postwar public works projects.

East Bay sanitary district

On the east side of the bay (opposite from San Francisco), the municipalities of Oakland, Berkeley, Alameda, Albany, Emeryville and Piedmont heeded the warning of State Health Director Wilton L. Halverson to provide for an adequate sewage disposal system, or face state action, by voting to participate in the formation of an East Bay sanitary district. The six cities and towns, in the immediate prewar days, had a combined population of about 520,000. Since Pearl Harbor and the influx of war workers their population has grown to in excess of 600,000. Even in prewar days their sewage disposal systems were inadequate, but with their recent rapid growth a genuine health problem has arisen through the fact that raw sewage is being dumped into the bay.

The issue approved at the polls authorized the already existing East Bay Municipal Utility District to investigate and determine the sewer requirements for the municipalities. A definite program, together with a bond issue to cover costs of the work, will be presented to the voters at a later date.

A similar survey, started in 1940 and completed a year later, called for an expenditure of $6,886,000. This report, sponsored by city of Berkeley acting as the agent for other East Bay municipalities was prepared by a board of consulting engineers consisting of Charles Gilman Hyde, Harold F. Gray and A. M. Rawn.

Inconclusive report on Cleveland fire

Why the East Ohio Gas Company's liquid-gas storage plant at Cleveland exploded and burned Oct. 20 (*ENR*, Nov. 2, p. 535) is likely to remain a mystery, it appeared as an investigating committee completed its hearing last week. Indications were that the committee's conclusions would be tentative, and would cite the possibility that unforeseeable changes in the molecular structure of the steel tanks under the extreme cold of liquid natural gas was a contributing factor to the accident.

The committee of ten experts appointed by Mayor Frank J. Lausche has heard dozens of witnesses.

Predominant in their testimony was the belief that a leak in one of the heavily-insulated spherical steel tanks preceded the fire and explosion.

The tank in question consisted of two concentric spheres, the inner one 57 ft. in dia., the 36-in. space between the two walls filled with cork. Also destroyed was a cylindrical tank, of 70-ft. dia. surrounded by 3 ft. of rock wool and an outside steel cylinder. This cylindrical tank held the equivalent of 90,000,000 cu. ft. of gas.

Before the explosion, witnesses said, a frosty cone formed near the top of the spherical tank, from which swirled a misty vapor. The liquid gas, under only slight pressure at minus 257 deg. F., was gasified at atmosphere temperature. Mixed with air such gas becomes explosive. Such an explosion wrecked the tanks, sending liquid gas into the air and into the sewer to emerge blocks distant as fountains of flame.

Two spherical tanks, each holding the equivalent of 50,000,000 cu. ft. of gas, remained intact through the fire, and subsequently were emptied.

Testimony indicating that a leak was the first occurrence was bolstered by evidence that such trouble had developed when the cylindrical tank was first tested in May, 1943. When the subzero liquid was introduced, uneven contraction of the steel plates caused a rupture in the bottom. This did not occur at the welded seams but in the metal itself, it was testified.

East Ohio Gas Co. has announced that the site will be abandoned. It has not decided whether to reconstruct the plant elsewhere. A newly-enacted Cleveland ordnance forbids such an installation in a congested district.

• • •

Two more states against auto tax diversion

Voters in the state of Washington last week, by a two to one majority, approved a proposed amendment to the state constitution restricting the automotive tax fund to use for road purposes exclusively. At the same time a similar proposition in Nebraska was defeated.

The favorable vote in Washington brings the total of states having constitutions amendments to protect their automotive tax funds to 16.

The citizens of Maine at their Sept. 11 election ratified such an amendment by more than four to one.

The total amount of highway user taxes diverted to non-highway purposes in 1943 is estimated by the Public Roads Administration at $155,455,000, or 13.8 percent of state taxes on highway users, compared with $204,165,000 or 15.3 percent in 1942.

The states which now have constitutional restrictions against such diversions are: California, Colorado, Idaho, Iowa, Kansas, Maine, Michigan, Minnesota, Missouri, Nevada, New Hampshire, North Dakota, Oregon, South Dakota, West Virginia and Washington. In addition to these states, the following states made no diversions for non-highway purposes in 1943: Arizona, Arkansas, Connecticut, Mississippi and Wyoming.

• • •

Sewage and sanitation discussed at Toronto

The eleventh annual meeting of the Canadian Institute of Sewage and Sanitation was held in Toronto, Ont., Nov. 2-3, attracting a record attendance of 336. Membership attained a new record, totalling 198 as against 157 a year ago.

R. J. Desmarais, city engineer of Windsor, Ont., was elected president, succeeding F. L. Parsons, city engineer of Peterborough, Ont. H. S. Nicklin, city engineer of Guelph, Ont., was elected vice president and A. E. Berry, director of the sanitary engineering division of the Ontario Department of Health, and new president of the Federation of Sewage Works Authorities, was re-elected secretary-treasurer.

Engineering employees in Ontario organize for collective bargaining

Registered professional men of the province set up the Federation of Employee-Professional Engineers and Assistants

The Federation of Employee-Professional Engineers and Assistants has been formed in Ontario under the guidance of the Association of Professional Engineers of Ontario, which is the legally recognized agency for licensing professional engineers in that Canadian province. According to the journal of that association, *The Professional Engineer*, the federation was organized with the object of enabling members of the association to take advantage of the collective bargaining procedure that now is possible under the terms of an act passed in Ontario last year and a federal order-in-council issued early this year covering all employees in industry except certain exempted fields, those employed in a confidential capacity, and those with power to hire and fire.

Restrictions on membership

Membership in the federation is restricted to:

(a) Members of the Association of Professional Engineers of the Province of Ontario;

(b) Persons licensed by the association to practice professional engineering;

(c) Graduates or undergradutes of a college, or bona fide engineering assistants serving under articles who are recorded with the association as engineers-in-training.

Members must be residents of the province or working in the province, except as noted below; they must be employed on a wage or salary basis as distinguished from a fee basis, or they must be usually so employed though temporarily unemployed; and they must be employees within the definition of that term by the federal wartime Labor Relations Regulations.

Members of the federation cannot be members of a trade union. That restriction was set up to avoid jurisdictional disputes.

Men employed outside the province of Ontario may be represented by the federation on an inter-provincial or federal basis.

Branches may be formed on a district basis, and units may be set up by members who are employed in one locality by a common employer.

The federation is headed by Victor S. Murray, bridge engineer of the Ontario Department of Highways.

Plans for establishment of a similar agency for collective bargaining are being considered by the Corporation of Professional Engineers of Quebec, where the members voted recently in favor of collective bargaining through an organization set up by engineers in preference to a trade union, the vote being 536 for the engineer's group as against 13 for a union.

Engineering Institute canvass

An attempt to canvass opinions with respect to collective bargaining among members of the Engineering Institute of Canada, which includes engineers in all branches of work in the dominion, resulted in the return of only 50 percent of the ballots. Of these, 92 percent wanted the federal order-in-council amended to clarify the position of engineers. If this cannot be obtained, 65 percent want engineers to be excluded from the order by action of the Wartime Labor Board. Eighty-five percent expressed themselves as willing to support a collective bargaining group of engineers should creation of such a group become necessary.

• • •

Senate approval sought for St. Lawrence work

Following a conference Monday with President Roosevelt, Senator George D. Aiken of Vermont this week informed an *Engineering News-Record* representative that he plans to make a motion before the Senate, which reconvened Tuesday, to have improvement of the St. Lawrence waterway included in the Rivers and Harbors Bill now before that body. The Senate is expected to act on the proposed bill in the next few weeks.

Because the House of Representatives on March 22 passed a Rivers and Harbors Bill (H. R. 3961) that did not contain the St. Lawrence work, approval of such a motion might delay passage of the bill by Congress.

The program to be recommended by Senator Aiken calls for improvement of 48 miles of the international section of the river in the vicinity of Massena, N. Y. Total cost of the work is estimated at $421,000,000 of which Canada would be asked to supply $144,000,000 and New York State over $93,000,000, the U. S. federal government furnishing the remainder.

The construction would be for two major purposes, improved navigation and power development. Movement through the improved section of 10 million tons of additional shipping by U. S. shippers and an equal amount by Canadian organizations would be possible annually, according to Senator Aiken. He also reports that over 13 billion kilowatt-hours of electrical power could be produced annually.

Because most of the construction now proposed would lie in the United States, proponents believe that the work should be carried out by the U. S. Army Engineers. Construction of the dams and locks is expected to require four years, while installation of the generating equipment would be spread over a ten-year period.

Believing legislation providing for development of power and navigation along the St. Lawrence River might well be based on a treaty rather than an agreement between this country and Canada, Senator John H. Overton of Louisiana has proposed to his subcommittee of the Senate Commerce Committee that a public hearing be called for Nov. 20 to hear witnesses. After the hearing the subcommittee will decide whether or not it should recommend the return of the bill now before it to the Senate for reassignment to the Foreign Relations Committee.

The St. Lawrence project has been defeated in the Senate on two occasions. In both instances, however, the project came to the Senate as a treaty and failed because the ratification of a treaty requires a two-thirds vote. The proposal now before Congress is in the form of an agreement. Its proponents are arguing that such an agreement is not a treaty and does not require a two-thirds vote.

• • •

Estimates $3.7 billion construction in 1944

War Production Board estimates for construction put in place in 1944 (including contracts carried over from 1943) indicate a volume of $3,700,000,000 for the year, 48 percent of the 1943 total reported by the WPB. The prediction, based on statistics available through October, takes into account seasonal factors and anticipates continuation of construction controls for the balance of the year. WPB figures are for expenditures in the calendar year.

Engineering News-Record's estimate for all new construction *put under contract* in 1944 totals $2,900,000,000, a volume 42 percent lower than in the preceding year. Of the *ENR* estimated total, 49 percent is for federal work; 14 percent for state and municipal construction; 27 percent for private construction, including private mass housing; and 10 percent for residential.

MEN AND JOBS

The appointment of **Laurence A. Gillett,** former regional director of the Federal Works Agency region comprising the six Midwestern states, to be regional director for Region 1, including the New England States, New York, New Jersey and Pennsylvania, was recently announced.

Mr. Gillett holds the degrees of B.S. in sanitary engineering from the Massachusetts Institute of Technology, and B.S. in civil engineering from Harvard University. Before entering the service of the federal government in 1933 as district director in Cincinnati, Ohio, for the FERA and WPA work programs, Mr. Gillett had worked for railroads and highway departments and as a civil and sanitary consulting engineer in West Virginia, Illinois, Massachusetts and New Jersey. Between 1923 and 1928 he was structural engineer for the Florida East Coast Railway Co., with offices at St. Augustine, and from 1928 to 1933 he was the structural engineer of the Cincinnati Union Terminal Co., working on the design and construction of the $50,000,000 passenger terminal.

In 1942 Mr. Gillett was appointed as director of the FWA region in the Middle West. He has been in charge of the regional office in New York since Oct. 1, 1944.

W. Zode Smith, for the last 34 years general manager of the waterworks of Atlanta, Ga., and an employee of the city for nearly 55 years, has just been re-elected to his position by the city council.

Brig. Gen. L. J. Sverdrup is now chief engineer to General MacArthur's Expeditionary Forces, Maj. Gen. Hugh J. Casey, who was chief engineer, having been transferred to another theater of operations. General Sverdrup went out to the South Pacific early in the war as a civilian consultant on airbase development for the War Department, expecting to stay only a matter of weeks. He was soon in uniform, and is now about to spend his fourth Christmas in the South Pacific. In private life General Sverdrup is a partner in the consulting engineering firm of Sverdrup & Parcel, St. Louis, Mo.

First Lt. Arend W. Block, Grand Rapids, Mich., with the other members of his engineering unit, was cited recently by Gen. Douglas MacArthur for "meritorious action" in a recent campaign in the southwest Pacific area. Commissioned at an officer candidate school in Australia last January, he has just been promoted to first lieutenant. He has been with the Army Engineer Corps for two years.

L. C. Smith, Mason City, Ia., who resigned as division supervisor of buildings and bridges for the Mason City division of the Chicago & Northwestern RR., has been appointed acting division engineer of the Black Hills division, with headquarters at Chadron, Neb. He is being succeeded at Mason City by **W. V. Kerns,** of Escanaba, Mich.

I. V. Howenstine, city engineer at Muscatine, Ia., has been appointed co-county engineer of Muscatine County, with **Earl J. Wheeler.** He will have charge of construction and maintenance of roads.

Maj. E. O. Smithfield, former Atlanta, Ga., construction engineer, is in charge of the resident engineers' office at Fort Bragg, N. C., where he supervises construction for military installations in North Carolina.

Roy Buck has been appointed acting city manager of Big Rapids, Mich. He succeeds the late Leland Baxter. Mr. Buck is a member of the Mecosta County, Mich., Road Commission.

C. C. Jones, for several years with the Public Roads Administration, and more recently stationed at Richmond, Va., is now in charge of the bridge work on the surveys for a 30-mile road project in the Canal Zone. He expects to be in Panama about six months.

Many municipal postwar plans

Typical of much municipal work now being planned for the early postwar period are these proposed projects in six cities and five states:

A report compiled by city plan engineers and department heads for a 5-year, $30,000,000 development in Kansas City, Mo., is being considered by the city council. Mayor Gage says the plan is designed as a foundation for postwar development. Much of the cost will have to be by general obligation bonds and revenue bonds, and some by special assessment.

The Federal Works Agency at Fort Worth, Tex., will recommend to Washington the approval of a $190,000 municipal water system expansion program at Waco, Tex., according to George Rohan, Waco water superintendent. For this program, the FWA will recommend that the government furnish 40 percent of the cash, or $76,000. The Waco water department will furnish the remaining $114,000.

The project will provide for the installation of new 20-in. and 12-in. mains; for the purchase and installation of two pumps with a low-lift capacity of 18,000,000 gpd. and two pumps with a high-lift capacity of 10,000,000 gpd.; also for the cleaning of certain existing city water mains.

This project is only a part of Waco's $400,000 water expansion program. It expects to complete the rest of the program with its own funds.

Thomas J. Morrison and Meloy Smith, consulting engineers, have been retained by the town board of Brighton, N. Y., a suburb of Rochester, to prepare an outline for future sewer projects and determine whether a proposed $606,000 postwar sewer project for Sewer District 2 will be advisable. The engineers will work in co-operation with Town Engineer Charles Walker.

The examining committee of the Milwaukee, Wis., board of estimates has approved the 1945 permanent improvement program which sets up $3,800,000 for capital improvement projects.

The first link of the proposed $24,000,000 Los Angeles River Freeway from San Fernando to Long Beach, Calif., was given official sanction of the Los Angeles County Board of Supervisors recently when that body requested that $30,000 be appropriated at once to defray planning costs. The portion unanimously approved involves about five miles of construction estimated to cost $2,691,500.

The $30,000 appropriation requested represents part of the county's share in a $500,522 fund set up by the state to cover costs of drafting plans and specifications for postwar public improvements.

The city of Houston, Tex., has provisionally adopted a $31,000,0000 postwar improvement program. A $7,500,000 school bond issue was approved by Houston voters Nov. 7.

Management changed on Nisqually project

The Charles T. Main Co. of Boston, Mass., which has been in charge of construction of the Second Nisqually power project for the city of Tacoma, Wash., since May, 1943, has been relieved of its duties there and Verne Gongwer, former chief construction engineer for the city, has ben reinstated as head of the project. The management agreement between the Tacoma Public Utilities Commission and the Main company was terminated on Sept. 23 by Commissioner C. A. Erdahl, and his action was confirmed by the city council about two weeks later.

The current work includes enlargement of the city's hydro power system by the construction of two dams on the Nisqually River, a long tunnel and a power plant at a cost originally estimated at $19,650,000 but now placed at $23,000,000. In the spring of 1943, when the cost of the work began to rise, the city council authorized the Commission to engage Charles T. Main Co. at a fee of $1,250 per month, for which the firm was to supply a chief engineer to take charge of the project. Under this new arrangement J. J. Downey of the Main company acted as chief engineer and Mr. Gongwer served as construction engineer.

Costs continued to rise under the new management according to Mr. Erdahl, and the completion date had to be postponed. As a result it was decided to terminate the agreement with the Main company and complete the work under supervision of the city's own forces.

• • •

Full command in Burma given to General Sultan

Lieut. Gen. Daniel I. Sultan, recently promoted to that rank (*ENR* Oct. 5, p. 394) on Nov. 12, officially took command of Chinese armies in Burma, succeeding Gen. Joseph W. Stilwell, under direct deputization from Generalissimo Chiang Kai-shek.

Now under General Sultan as commander of the northern combat area are the Chinese First Army, the Chinese Sixth Army, the British Thirty-Sixth Division, and what General Sultan describes as a "considerable force" of Americans who soon will be ready to assist in the Allies' southward drive.

General Sultan said the aim of American forces in the India-Burma theater was unchanged—to defeat the Japanese in North Burma, to open a road and deliver fullest assistance to Chinese forces in China.

Paper industry launches pollution research work

The National Council for Stream Improvement of the Pulp, Paper and Paperboard Industries has announced the establishment of a stream research project at Manhattan College in New York under the direction of Prof. C. J. Velz, head of the department of civil engineering.

The project, relating to a sanitary analysis of watersheds, will include calculations of projected stream profiles to determine the degree of pollution responsibility of the pulp, paper and paperboard industries in relation to other industries, and to point out how much abatement is necessary to return streams to a condition which will be satisfactory for the uses to which they are put.

This information will also help in guiding the research program conducted by the council, which is concerned with treatment and recovery of wastes and is meant to insure the industry against investment in inadequate treatment facilities.

Professor Velz is an authority on the subject of stream pollution analysis, having been instrumental in the development of several basic equations now in use.

Floods and droughts were abnormalities of 1944 water year

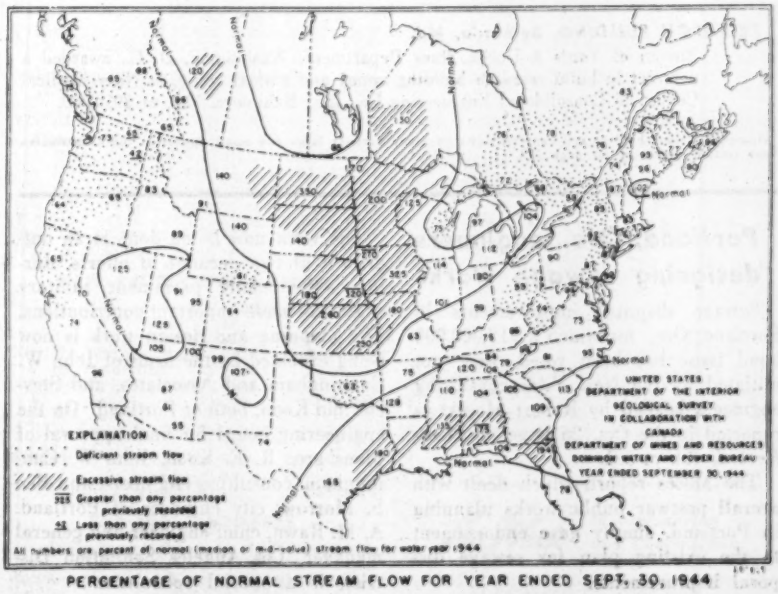
Damaging floods and excessive runoff in the agricultural central West, and droughts in the important hydro-power producing areas of the industrial Northwest and Northeast were the dominant abnormalities of the 1944 water year, which ended September 30.

Although stream flow in the West was widely and frequently subnormal, especially in the Columbia and Gila river basins, irrigation supplies were adequate chiefly because of the relatively large carryover of storage from last year. Storage reserves on hand at the close of the year as a safeguard against possible deficiencies next year are not generally less than normal.

The year was the third wettest on record in the north central region from Kansas to Manitoba. From east Texas to northern Florida a similar condition existed.

Runoff during the water year was exceptionally deficient in the Pacific Northwest and British Columbia, where the annual flow of the Columbia River at Grand Coulee was lowest in 30 years. On an areal basis annual runoff was excessive in 19 percent, of the United States, deficient in 13 percent, and normal or near normal in 68 percent. For the country as a whole stream flow averaged 108 percent of normal.

Natural ground-water levels, as observed in key wells not affected by heavy pumping, were generally above normal in the North-Central and Rocky Mountain states. On the other hand, they were somewhat below normal in the Southern and Eastern states during most of the year.


Normal
EXPLANATION
Deficient stream flow
Excessive stream flow
Greater than any percentage previously recorded
Less than any percentage previously recorded
All numbers are percent of normal (median or mid-value) stream flow for water year 1944
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
IN COLLABORATION WITH
CANADA
DEPARTMENT OF MINES AND RESOURCES
DOMINION WATER AND POWER BUREAU
YEAR ENDED SEPTEMBER 30, 1944

PERCENTAGE OF NORMAL STREAM FLOW FOR YEAR ENDED SEPT. 30, 1944

JOBS OF THE WEEK

IMPROVING RUNWAYS, TAXIWAYS, Anacostia, D. C.

Bureau of Yards & Docks, Navy Department, Washington, D. C., has awarded a contract for improving runways, taxiways, and warm-up aprons at Naval Air Station to J. C. Langenfelder & Son, Baltimore, Md., at $1,348,786.

ROADS, Pennsylvania.

Pennsylvania State Highway Department, Harrisburg, awarded contracts to Potts & Callahan, Baltimore, Md., for improving two roads. First project includes reinforced concrete paving and bridges on 4.85 miles U. S. 22, and Traffic Route 72, East Hanover, Union and Swatara Twps. at $1,225,752; the second project is for the same type of work on 3.24 miles Route 22, East Hanover Township at $672,262. Both are in Lebanon County.

APARTMENT, North Arlington, N. J.

Len Home Builders, Inc., North Arlington, will construct by separate contracts 17-building garden apartments to cost $2,000,000. B. Sumner Gruzln, Jersey City, is the architect.

ELECTRIC PLANT, Monterrey, Mexico.

City of Monterrey will construct an electric light plant. Equipment contracts have been awarded to General Electric Co., New York; Westinghouse Electric & Manufacturing Co., New York; Babcock & Wilcox Co., New York; and Crane Co., New York. The total estimated cost is $1,600,000.

AIRPORT, Canton, O.

Lewis & Frisinger Co., E. B. Schwaderer Co., and Julius Porath & Son, Ann Arbor, Mich., have been awarded a contract for the constructing of an airport, including grading, clearing, drainage three 5,600 x 150 ft. runways, taxiways and aprons by the Civil Aeronautics Administration, Chicago, Ill. at $1,675,534.

SHOPPING VILLAGE, Dallas, Tex.

Carl M. Brown & Associates, Dallas, awarded a contract to build shopping village to Carl M. Brown, Dallas. The estimated cost is $2,000,000. Hare & Hare, Kansas City, Mo., are the architects.

CARBON BLACK PLANT, Altman, Tex.

United Engineers & Constructors, Inc., Houston, Tex., and Phila., Pa., will design and construct a carbon black plant for the Continental Carbon Co., Altman, at an estimated cost of $1,250,000.

PLANT EXTENSIONS, Sandusky, O.

E. E. Badger & Sons, Boston, Mass., has been awarded a contract by the U. S. Engineers, Washington, D. C., for constructing plant extensions and residual acid lines at Plum Brook Ordnance Depot at $1,104,546. Trojan Powder Co., Allentown, Pa., is the operator.

RESEARCH BUILDING, Bethesda, Md.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract to build research building annex and animal house, at Navy Medical Center, to Consolidated Engineering Co., Inc., Baltimore, Md., at $959,000.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 187.

Portland, Ore., engineers designing sewage works

Sewage disposal improvements in Portland, Ore., for which a $12,000,000 bond issue has been voted, were not initiated by the New York consulting engineers headed by Robert Moses, as reported in the Oct. 26 issue of *News-Record*, vol. p. 521.

The Moses report, which dealt with overall postwar public works planning in Portland, simply gave endorsement to the existing plan for sewage disposal improvements.

The work now being done is an outgrowth of two decades of efforts, during which many prominent sanitary engineers made important contributions. The planning and design work is now being executed by the firms of John W. Cunningham and Associates, and Stevens and Koon, both of Portland. On the engineering board for final approval of plans are: R. E. Koon, John W. Cunningham, consulting engineers, and Ben S. Morrow, city engineer of Portland. A. M. Rawn, chief engineer and general manager, Los Angeles Sanitation District, is a special consultant.

Plastics not yet ready for building field

Adoption of plastic materials in the building field is contingent on the development of suitable standards and specifications. This was the consensus of architects attending the joint meeting of the Society of the Plastics Industry and the New York Chapter, the American Institute of Architects, held Nov. 12 in New York City. As an agent for the owner, the architect is obligated to specify only those building materials of whose quality and behavior he is certain.

Questions asked by the plastic manufacturers regarding the prices of building materials displayed their interest in evaluating competitive products. At present, it appears that although plastics are superior in quality to many of the materials they are intended to replace, they generally cost more.

While the use of plastics for bonding agents, paints, tubing and piping was discussed, of greatest interest to builders is the possible application of plastics to precast construction. For all practical purposes, there is no limit to the size and shape of molds and it was said that many satisfactory plastic materials for use as walls and flooring will be available after the war. It is not impossible that whole rooms, such as kitchens, and also showers and bathrooms, may be precast as a single unit.

The plastic manufacturers declared, however, that they did not visualize the replacement by plastics of most materials now used as fixtures, and expressed a desire to cooperate with the building industry.

• • •

Baltimore votes 3 to 2 for a new freeway

By a ratio of 3 to 2, the voters of Baltimore, Md., last week authorized the municipal government to float the proposed $10,000,000 through-highway loan, making possible the construction of a high-speed traffic channel through the city.

The final decision whether this is to be a tunnel under the harbor, a bridge across the harbor or an expressway, will be made later by city authorities.

Mayor McKeldin has announced that he will start next year all public improvements to be financed by loan funds allotted in the 1945 budget, providing Federal priorities can be obtained.

There is listed in next year's budget a total of $18,454,294 in loans for schools, water, sewers, highways, conduits and public buildings. Of this amount $10,400,000 is from loans approved in the recent election.

OBITUARY

Henry Fowler, 75, head of the Chicago roadbuilding firm of John A. McGarry & Co., and president of the Illinois Road Builders Association, died at his home in Wilmette, Ill., Nov. 5. Mr. Fowler was dean of paving contractors in Illinois. He joined forces with John A. McGarry in 1897 to form the firm of that name. During 47 years that company built hundreds of miles of roads and streets in Illinois and surrounding states.

Charles B. Lindsay, 69, for more than 20 years an engineer for the Kansas Highway Department, died Nov. 4.

Samuel Knopf, 55, principal assistant engineer of the Delaware State Highway Department for the past 27 years, died at Dover recently. He was a graduate of the University of Delaware, 1912, and began his highway engineering in 1915 under Charles M. Upham, as chief draftsman on the construction of the Coleman DuPont Boulevard.

Lt. Col. Frederick H. Richardson, 61, former chief of the Co-ordination Section of the Engineers Supply School at the Columbus, Ohio, Army Service Forces Depot, died Nov. 6 in Salt Lake City, Utah.

William McKee, 59, for the last 17 years manager of the St. Mary's, Ont., public utilities commission, died Nov. 4.

Albert Rix Shedd, Navy Department consulting engineer for 28 years, died in Washington, D. C., Nov. 4. After graduation from the Massachusetts Institute of Technology, he was employed in engineering in Chicago and Hingham, Mass. He entered the Navy Department in 1916 and was retired last June.

Charles H. Becker, 52, of Narberth, Pa., nationally known expert in the field of water works, died Nov. 9. He was in charge of the hydrant and valve department of the R. D. Wood Co., Philadelphia, having been associated with the firm since 1913. He was a director of the Florence Pipe Foundry and Machine Co., a member and director of the American Water Works Association, and president of the Water and Sewage Works Manufacturers' Association.

John G. Foley, 44, highway engineer and former engineer with the New York City Armory Board, who for the last two years had been doing war work at a Fall River, Mass., shipyard, died Nov. 8. He was a graduate of Rutgers University. He saw service with the Army under command of the late Maj. Gen. William S. Graves in Siberia in 1918-20.

Robert A. Howie, Jr., 61, of South Orange, N. J., head of a contracting firm, died Nov. 9. He founded his contracting firm in 1919 and built a number of important bank buildings and apartment houses in New Jersey.

George B. Cameron, 76, a retired building contractor, died in Newton, Mass., on Oct. 31. He was a native of Nova Scotia, and had been in business at Newton for many years.

Harry Clark Steele, 93, a retired Jacksonville, Fla., building contractor, died Oct. 31. He had constructed many Jacksonville homes.

Daniel E. Donovan, 69, building contractor of Oklahoma City, Okla., died recently. A graduate of Iowa State College he went to Oklahoma City in 1907.

Walter S. Birket, 67, civil engineer, of Peoria, Ill., died Nov. 2. He became associated with Jacob A. Harman, head of an engineering firm bearing that name, and later became a member of the firm. He took an active part in the planning and construction of many private and public improvement projects, including airports. He retired several years ago.

WEEKLY CONSTRUCTION SUMMARY

CONTRACTS

Continental U. S. Only (Thousands of Dollars)

	1943 Week Ending Nov. 18	1944 Week Ending Nov. 9	1944 Week Ending Nov. 16
Federal	$27,426	$5,550	$13,889
State & Municipal	1,599	1,438	5,861
Total public	$29,025	$6,988	$19,750
Total private	39,906	1,817	9,650
TOTAL	$68,931	$8,805	$29,400

Cumulative
1944 (46 weeks) $1,577,354
1943 (46 weeks) $2,848,861

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1943 46 Weeks	1944 46 Weeks
NON-FEDERAL	$304,261	$417,378
Corp. Securities	18,228	106,120
State & Mun.	120,355	166,318
RFC Loans	14,545	61,940
FPHA Loans	3,133	.....
REA Loans	20,000	20,000
Fed.-Aid Hwy	128,000	63,000
FEDERAL	$2,753,838	$1,263,800
TOTAL CAPITAL	$3,058,099	$1,681,178

ENR INDEX NUMBERS

Index base=100		1913	1926
Construction Cost	Nov. '44	301.09	144.73
Building Cost	Nov. '44	236.10	127.63
Volume	Oct. '44	91	40

MEETINGS

National

THE PRODUCERS' COUNCIL, INC., 21st semi-annual meeting, Hotel Roosevelt, New York, N. Y., Nov. 27-29.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS, annual meeting, Netherland Plaza Hotel, Cincinnati, Ohio, Nov. 27-30.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA, governing and advisory boards, Drake Hotel, Chicago, Ill., Nov. 28-29.

AMERICAN SOCIETY FOR TESTING MATERIALS and American Institute of Mining and Metallurgical Engineers, Symposium on Stress-Corrosion Cracking, Benjamin Franklin Hotel, Philadelphia, Pa., Nov. 29-Dec. 1.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS, 10th annual convention, Hotel Commodore, New York, N. Y., Dec. 1-2.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual meeting, Hotel Commodore, New York City, Jan. 17-19, 1945.

Regional and Local

MISSISSIPPI VALLEY ASSOCIATION, 26th annual convention, Hotel Statler, St. Louis, Mo., Nov. 26-27.

ILLINOIS SEWAGE OPERATORS' ASSOCIATION, annual conference, Leland Hotel, Springfield, Ill., Nov. 28-29.

CONFERENCE ON INDUSTRIAL WASTE UTILIZATION, sponsored by the Sanitary Engineering Department, School of Civil Engineering and Engineering Mechanics, Purdue University, and others, Purdue University, Lafayette, Ind., Nov. 29-30.

NEW YORK STATE HIGHWAY CHAPTER, ASSOCIATED GENERAL CONTRACTORS OF AMERICA. 19th annual meeting, DeWitt Clinton Hotel, Albany, N. Y., Dec. 6-7.

ASSOCIATED GENERAL CONTRACTORS OF MINNESOTA, 26th annual meeting, St. Paul Hotel, St. Paul, Minn., Jan. 11-13, 1945.

Cancellation

NORTHERN CALIFORNIA CHAPTER, ASSOCIATED GENERAL CONTRACTORS, has canceled its 26th annual convention scheduled for San Francisco Dec. 8 and 9.

The Week in Engineering and Construction

(*Continued on page* 116)

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Fires in Brazil

Sir: It is noticed that the special representative of *ENR* who has been investigating structural engineering in Brazil, Argentina and Uruguay comments on the small fire losses in those countries. Personally, during 20 years residence in Rio this writer can recall few fires of any importance. Perhaps the reason for the few fires in Brazilian cities is due to a combination of circumstances. Residences today are invariably of reinforced concrete skeleton construction with brick walls and tile roofs. Even wooden stairways are prohibited and only hard wood trim and hewn wood roof trusses are used. The latter, being above the concrete roof slab of the top story, functions as a support for the tile roof. There are no cellars nor dark closets where inflammable refuse can accumulate and refuse of all kinds *is collected daily*. There are also frequent inspections by the uniformed sanitary police. In commercial and industrial buildings the supply of inflammable materials that may be stored is limited to small quantities and the major inflammables such as oils, turpentines and gasoline are kept in deposits far removed from built up areas and imported into the city daily in quantities sufficient for daily consumption only. This combined with extreme cleanliness in both private and civic housekeeping, the elimination of heating for homes and buildings in general, and the use of non-inflammable materials in construction probably tells the story. Concerning dock fires, which are frequently very destructive and costly in our ports, South American ports are usually equipped with quays and not with piled wharves.

Consequently, there is no place where refuse and floating volatile liquids can collect, reducing fire risk and eliminating much that is so offensive in our own harbors. While South American practice in construction could not be adopted *in toto* here, there is much that we could learn there with advantage, not the least of which is the cleanliness of their cities and building codes in which special favors to some interest is absent.

C. J. SEIBERT
Washington, D. C.

Safety Against Earthquakes

Sir: You have published an excellent editorial (Sept. 21, vol. p. 341) on "Earthquake Lessons Repeated."

This should be read thoughtfully in regions where earthquakes are infrequent. That is where surprise will be greatest and destruction most severe when seismic disturbances do occur.

It is not only "earthquake zones" that are vulnerable. In such zones risk to life and limb may be really less. In California, for example, risk has been greatly reduced by a decade of building laws that have made quake-resistant design mandatory. Buildings built to resist horizontal forces do not collapse on the occupants when quakes occur. The real holocausts can be expected where designers disregard horizontal forces. Reason for this disregard may be because earthquake risk is believed "very remote;" more often because the designer is unfamilar with simple, inexpensive expedients.

The vital question is not how infrequent the occurrence but whether shocks will come during the lifetime of the person involved. Each individual is deeply concerned when his own family is affected. To be logical he should give advance thought to the risks, particularly those in school buildings, that can be greatly reduced by modern design and at low cost.

But logic is not the rule. Safeguards usually are neglected until some disaster occurs and then, when it is too late, the individual is deeply moved. Something more important than a little precautionary expense in school construction is uppermost in the mind of the man who searches frantically through a wrecked school building for bodies of his own children. An apathetic situation can quickly change to a pathetic situation.

Whether the probable frequency of earthquakes is 30 or 300 years is relatively unimportant. The really important point to every individual is whether he is willing to have himself or his family in an unsafe building when the earthquake strikes.

H. M. ENGLE
Consulting Structural Engineer
Board of Fire Underwriters of the Pacific

Sir: Your editorial of Sept. 21, 1944, "Earthquake Lessons Repeated," deserves applause from all engineers interested in safe structural design.

It is unfortunate that the usual construction of two- and three-story brick wall-wood joist construction has developed into a process of balancing one element on another, resulting in an incoherent structure. Generally no thought is given to providing stability against horizontal forces.

It is also unfortunate that, where horizontal forces reveal the weaknesses of such construction, an attempt is usually made to lay all the blame on such scapegoats as "poor materials," "poor workmanship," "local lack of municipal building inspection," etc., trying to show that failure was due to special circumstances instead of frankly admitting that failure resulted from reckless disregard of the possibility that applied forces may have horizontal components.

Good materials and good workmanship are essential, but unless a structure is able to resist horizontal forces, good materials and good workmanship may not be enough to prevent failure. A swaying roof will batter down a well-built brick gable wall.

In new construction reasonable resistance to horizontal forces can be obtained at little or no additional cost by an experienced designer. The methods of design usually present no great technical difficulties, but it is essential that the structural design be thorough. The promiscuous use of anchors, bond beams, etc., as substitutes for a structural analysis leads to disaster.

To make an existing building earthquake resistant may be both difficult and expensive. This is work of a kind which brings neither profit or glory to the structural engineer. The ordi-

nary type of earthquake repair which consists in concealing the damage by replacing fallen parts and covering up cracks with paint or plaster is, of course, pure fraud.

California laws require that buildings be designed to resist wind and earthquake. There was some opposition to these laws at first, presumably on the ground of excessive costs. Recurring earthquakes of sufficient violence to point out the need of resistance to lateral forces have proved the need of these rules. Now after becoming familar with the means of providing horizontal resistance, structural engineers generally design buildings which have much more horizontal strength than required by statute. It appears that the original opposition to these laws was due mostly to a natural dislike to being "pushed around."

A. L. ENGER
Office Structural Engineer
Division of Architecture
State of California
Sacramento, Calif.

Development of Chimbote

Sir: I read with much interest Mr. Cleary's article on the development of Chimbote (*ENR* Sept. 21, vol. p. 360), particularly since I spent two years in Peru shortly after the last war and among my various duties there made a field inspection and report on railroad development for the Peruvian government including all the territory shown in your study. I visited Chimbote with Peruvian engineers and government officials and accompanied them on a trip of inspection over the railroad which ended near the present site of the new hydro-electric construction at the Cañon del Pato. It was then proposed to extend this line through the Cañon to open up the valley above and work was under way on some tunnel construction which I gathered from your paper has never been carried out. There were then no highways in that part of the country, and beyond the end of the railway we rode by mule and horseback to Huailas on the way to the town of Huaras. Returning we went up the other branch of the Santa from Chuquicara where the railroad extension was in process of construction, which in that time was planned to be carried over the divide to the Valley of the Marañon. We spent several days riding in this territory and I have among my collections of photographs at home several views of the points which your pictures illustrate, as well as others showing coal outcrops and other points of interest. I seem to have investigated this territory about 20 years too soon. We were just beginning road construction and while the various potentialities of that district were well known, the resources of the country were not then being helped by United States loans.

I am particularly interested in your description of the Chimbote Hotel which must have improved since my time there. It was my ill fortune to have to spend one Christmas week in that place waiting for a steamer and I think I have never elsewhere encountered such a dirty and unsatisfactory dining-room as that of the Chimbote Hotel.

As regards sanitation, I was also unfortunately too soon. I made studies on sanitation possibilities of several Peruvian towns including Huacho and Cuzco as well as Chimbote but they seldom were carried beyond the status of preliminary estimates. Now our government is providing free engineering and loans so that the work we planned then throughout Latin America is going forward at little or no cost to the neighbors.

I might make some comment on the remarks about Mr. Meiggs and the plan for Chimbote. There is nothing particularly original about a rectangular layout of streets, nor do most Peruvian coastal towns have narrow crooked streets. Sometimes they are narrow but seldom crooked and the rectangular plan, long before the plan of Mr. Meiggs, was standard for city layouts in Peru as can be seen in the remains of various ruins of Pre-Inca days. Such a layout as that of Chimbote is not infrequently found in Pacific port towns of Latin America where conservation of land is of no importance, and the development consists only of a small population principally engaged in the transfer of cargo between ships and railroads. The great advantage of Chimbote, naturally, is in its harbor and the proximity to the Santa River which is the largest of all streams in Peru draining into the Pacific Ocean, and has long been counted on for future irrigation development. While there I visited a sugar estate in the neighborhood which for its irrigation ditches utilized in part an ancient canal, part of an irrigation project in use before the arrival of the Spaniards. It was also apparent that this old Inca canal had been used to irrigate an area twenty times as great as that which was cultivated at the time of my visit.

Peru to me is the most interesting of the South American countries and I have regretted that an opportunity for my return there has never presented itself except for a passing view from the air. I congratulate you on your presentation of your investigation.

HENRY WELLES DURHAM
New York, N. Y.

Questionnaires of Employers

Sir: Please permit me to air a matter of interest, not only to engineers, but to anyone at all concerned with "The Rising Tide of Noseyism." In a questionnaire recently mailed me by a firm employing technical help I was asked, among other things, to state: my religion, what church I attended, what insurance policies I maintained, my banking connections and whether I owned, was buying, renting or boarding at a home.

While I readily concede and uphold the right of an employer to require straightforward information relative to education, experience and other pertinent data concerning an applicant for an engineering or other position I am not prepared to support the thesis that he has also the right to concern himself with matters of a wholly private character. Such bureaucratic tendencies have no place in democratic America and the form of application for employment used by the Civil Service Commission does not offend in this respect. The questionnaire described in part above offends against the dignity of the individual and the engineer. There appears to be a growing tendency on the part of a number of organizations to extend their activities in personnel matters into what must always be considered the private domain of the individual and this should be curbed at the outset, through society and engineering organization action if we are not to lapse by degrees into an *ordered or totalitarian state.*

WILLIAM STACK
Registered Civil Engineer and
Land Surveyor
2506 Jackson Ave.
Evanston, Ill.

EDITORIALS

VOLUME 133 NUMBER 20

November 16, 1944

Postwar Highways

AMONG THE WORK that Congress has on its urgent program is passage of a postwar highway bill. Action on such legislation has been delayed month after month due to lack of agreement on the amount of money that should be authorized and the formulas by which federal aid is to be apportioned among the states and allocated by the states for main roads, secondary roads and city streets. Right now these details are not as important as is the passage of some legislation before the end of the year. Most of the state legislatures meet in January, and they cannot complete their part of the postwar highway planning without knowledge of what the federal plans are to be. This fact should be recognized by those who have obstructed passage of the bills now in Congress because they failed to meet all requirements. It is one thing to fight for a principle, but quite another to continue to block any action just because the majority will not accept every specific recommendation. Compromise is necessary if Congress is to act before it is too late.

Guidance for Returned Soldiers

EACH WEEK MORE SOLDIERS are being returned to this country for discharge due to wounds or the effect of serious illness, and each week finds many of these men undertaking to pick up the threads of an interrupted educational program or starting out to improve their economic position by added training. The federal government has undertaken to give educational and vocational guidance to these men as they are released from military service. But in many instances these young men are going back to high-school advisors in their home town for aid. These latter people, in turn, are looking to local engineers for advice when the veterans seek information on engineering matters. Here then is a channel through which engineers can help the returning men. In a few cities the local sections of the national engineering societies have had guidance groups working with the staffs of the preparatory schools for some years, using guidance material supplied by the Engineers Council for Professional Development. Many other large centers should have such groups, and in the smaller communities individual engineers can help in a less formal way. The field is relatively new and guidance for the returned soldiers is introducing some entirely new problems, yet it has promise of paying large dividends in helping the men from our armed forces to get reestablished in peacetime pursuits.

A Compromise Reached

ENDING A SITUATION that never should have developed, representatives of the U. S. Engineer Department and the U. S. Bureau of Reclamation have evolved a compromise plan for coordinated development of the resources of the Missouri River that is to be offered to Congress in place of the two conflicting plans put forward by those two federal agencies some months ago. The conferees have agreed on the major dams to be built to control the river's waters for navigation, flood control, irrigation and power. However, they have yet to agree as to which agency will build some of the structures serving more than one purpose, and they have yet to decide how the water is to be apportioned among possible uses. This latter subject is one on which the state governments will want to have some say, but it can wait. The significant aspect of the compromise is that it will permit actual planning for the Missouri River work to go forward in existing federal agencies, thus minimizing the probability of Congress creating a new agency to do that work.

Design for Rapid Construction

COORDINATING DESIGN with construction plans so as to assure most effective utilization of available materials, equipment and manpower was an important factor in the quick completion of the Tennessee Valley Authority's Fontana Dam, described elsewhere in this issue. Similar cooperation between designers and builders has been used effectively on many war construction projects, on architect-engineer-management contracts and particularly on work where the Seabees and Army Engineers have designed as they built. Getting maximum value for materials and manpower is one of the most desired objectives on postwar construction. To accomplish this, experienced contractors might well be consulted regarding plans and specifications now in preparation with a view to incorporating their practical suggestions. Assuredly, such a procedure at this time when contractors, generally, are not very busy would help materially to speed the start of work on the projects now being planned and

would facilitate their completion at the lowest possible cost.

Realistic Approach to Bargaining

ENGINEERS IN ONTARIO have taken a bold step forward in their attack on the problem of how to secure the advantages of collective bargaining for those engineers who find that they need it and yet do not wish to join a trade union to obtain those advantages. Employee members of the Association of Professional Engineers of the Province of Ontario have set up the Federation of Employee-Professional Engineers and Assistants to act on employment matters for themselves and for engineers-in-training. A similar plan is under consideration in Quebec.

Canadian engineers are taking a much more realistic attitude toward this problem than has been taken in this country save by the American Society of Civil Engineers. More than a year ago the council of the Ontario association explored the question of exempting engineers from the provisions of the provincial labor laws and came to the conclusion that such exemption was not desirable as it would deprive many engineers of needed protection against exploitation. When the matter was put to vote recently, the vote was largely in favor of retaining the right to collective bargaining, the bargaining to be done, if possible, through an organization of engineers. The new federation is the answer.

Over here our state societies of professional engineers could take similar action, but so far they have been conspicuous by their failure to take any action on this important matter. They fear they might do something that will lower the "dignity of the engineering profession". Meanwhile the technical unions are preparing to give the professional engineering employees the type of collective bargaining unit they need, one in which the professional men will not be submerged in a large group of subprofessional men with different ideals and objectives. If the unions succeed, their success will be due in part to the failure of our state societies to provide a comparable service.

What the Ontario engineers have undertaken is no easy task, as the A.S.C.E. has learned. Effective handling of collective-bargaining questions takes money and it takes men who can devote their full time to employment matters. In the end the Canadian engineers may not attain the independence from organized labor that they now seek. But in any event they will have the satisfaction of knowing that they have attempted to help their fellows meet the new problems of changing economic conditions. In so doing they assuredly will not have lowered the dignity of their profession.

Always, The War Is First

DESPITE THE GREAT need for accelerating postwar construction planning, there is an even greater necessity for improving war production, notwithstanding that overall figures show that we are missing monthly scheduled output by only 1 or 2 percent. Military leaders have recently expressed concern over lagging critical items, without, however, having been specific. Here are two examples, of interest to the construction field, which are causing worry: Of trucks, 4-ton capacity and heavier, we need about 8,000 a month and are getting less than 6,000, while of the smaller trucks we need 25,000 a month and deliveries are only about 20,000. Heavy-duty truck tires are being produced at the rate of 250,000 monthly, but the schedule is 330,000. There are other items, such as dry-cell battery production and cotton-duck weaving, which are woefully far behind schedules. Nor are straight "fighting" items all in the clear, the output of heavy field artillery and of transports and cargo ships being such that unless they are substantially increased our future invasion plans may have to be trimmed to fit.

Most of these difficulties stem from labor shortages, trucks being held up by a lack of castings which are short because not enough workmen will tackle dirty and difficult foundry jobs; dry cells and cotton duck being in insufficient quantity because workmen can't be induced to transfer from other jobs that seem to have "more of a future". It is a difficult situation, which no one promoting postwar planning would want to complicate. Theoretically, postwar planning for construction should have no adverse effect on war production, since it should only be engaged in by those whose energies can no longer be effectively applied to a current war job. Yet, should a conflict of interest arise, the choice should be immediate and automatic: Always, the war comes first.

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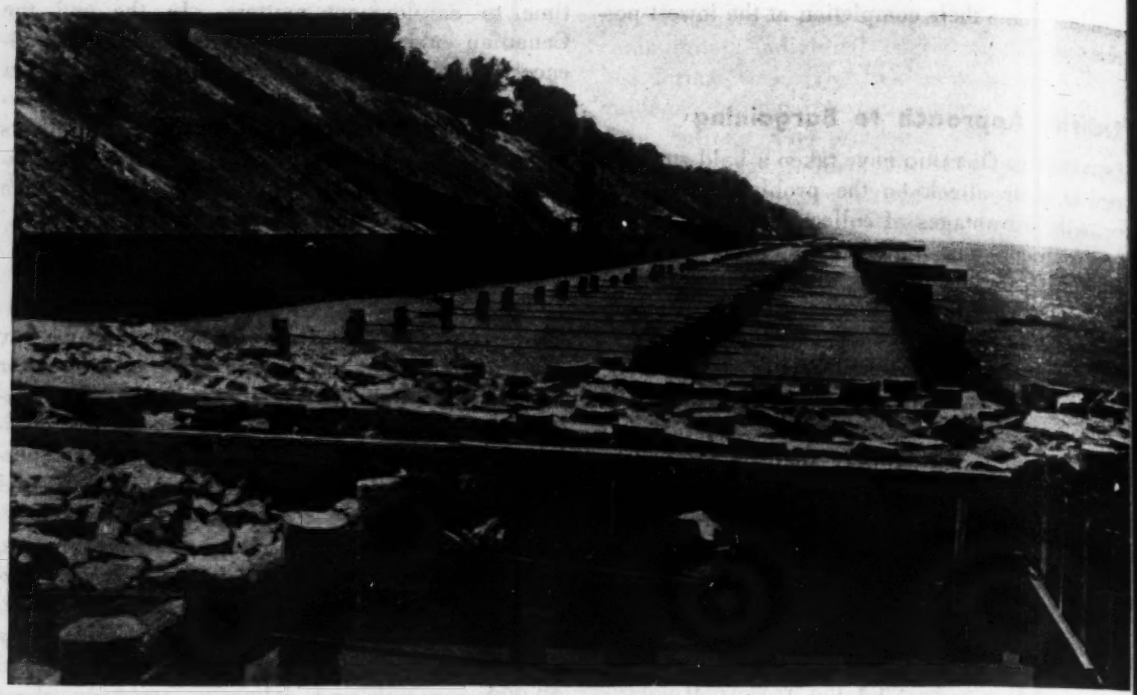

Fig. 1. Sheetpile bulkhead and rock-filled jetties prevent damage from waves on a railroad fill along Lake Michigan.

Twofold Protection for a Railroad Fill

***Contents in Brief**—Protection of a large railroad fill against destructive action of Lake Michigan requires a comprehensive layout of steel sheetpiling barrier and rock-filled jetties. Special measures also are taken to prevent the recurrence of a disastrous track washout.*

TWO DESTRUCTIVE ELEMENTS had to be reckoned with in providing protection for a recently completed large earthfill which carries the double track main line of the Pere Marquette Railway along the shore of Lake Michigan, near St. Joseph, Mich. One, was the wave action of the lake, eating away at the toe of the fill. The other was storm water cascading down onto the fill from an adjacent high bluff.

Construction of the railway embankment is of considerable interest due to the scope of the project and methods employed. But the installations required to stabilize the fill are of singular significance since they combine modern methods of beach erosion control with a practical method of preventing surface erosion from storm water.

At this particular location the Pere Marquette tracks run for some 2,000 ft. along a bluff overlooking the lake. Tracks are 80 ft. above lake level and about 140 ft. from the shore line. On the other side of the tracks a 30-ft. bluff rises to a residential area.

This site had long been recognized as being particularly vulnerable to destructive wave action from the lake, and when a vicious storm of short duration on May 30, 1943, washed out nearly 500 ft. of both railroad tracks, the need for permanent and adequate protection became all too apparent.

Washout delayed traffic

At the time of the washout, a contractor's crew was repairing a short length of steel sheetpiling between the lake and the old embankment. Serious interruption of the continued movement of war materials between Chicago and points east was avoided by pressing this crew into service to lay a temporary track around the washout. Traffic was resumed in less than 24 hours.

Following restoration of the double track, designs were prepared and a contract let for permanent improvement and protection of this stretch of roadbed. The work was divided into three essential phases, all of which were prosecuted simultaneously. They include: (1) widening the railroad embankment fill, (2) installing 3,650 lin. ft. of corrugated steel sheeting between the tracks and the adjacent 30-ft. bluff, and (3) constructing a steel sheetpiling bulkhead, rock-filled jetties, and other erosion control works along some 5,000 lin. ft. of shoreline adjacent to the new fill.

Widening of the existing railroad embankment was extended over a distance of about 2,000 ft. paralleling the lake shore, requiring 120,000 cu. yd. of sand-clay material. In general,

the new fill was built to a slope of 1 on 1.6. Its shoulder was extended a minimum of 30 ft. from the nearest track, with toe of the slope reaching the inner line of sheetpiling driven along the shoreline below.

Fill material was hauled by train from a borrow pit about one mile from the site, side-dumped along the westbound track, which was temporarily blocked off to traffic, and bulldozed over the embankment.

As widening of the fill progressed, two 15-ft. wide benches were excavated along the face of fill to eliminate the tendency for it to slide. Benches were established at about ⅓ and ⅔ the height of the fill above lake level. The lower one was excavated by a dragline operating along the beach—the other by a dragline working on top of the fill. No riprap was placed along the bottom of the fill, and neither was it compacted other than what it received from the bulldozer working on top of the embankment.

Protection from storm water

Protecting the top of the embankment and the roadbed from erosion by storm water cascading down the adjacent 30-ft. bluff required special measures. The method adopted was to intercept the surface water by a suitable ditch along the land side of the tracks, collect it in catchbasins at frequent intervals, carry it under the tracks and down the face of the fill.

Seven concrete catchbasins were built along the intercepting ditch, connecting with three 24-in. and two 48-in. reinforced concrete pipe culverts; one 24-in. and one 48-in. cast iron pipe culvert.

To prevent erosion of the face of the fill open flumes of rough oak timber, lined with 20-ga. steel sheathing salvaged from old box-cars were connected with five of the underdrains. Flumes extend from the top of embankment to lake level.

Flumes connecting with the 48-in. drains measure 6x6 ft. in cross section, while those for the 24-in. pipe are 5 ft. square. All flooring in the flumes is 4 in. thick and the sides are 2-in. timbers, braced with 6x6-in. wales and crossties, and securely bolted to timber piling driven 35 ft. into the face of the fill.

The flumes were installed prior to completion of the bulkhead and jetties so as to give immediate protection against storm-water erosion. This necessitated construction of a removable section for each flume where it crosses a narrow gage railroad operating along the shore for installing rock fill in the jetties. The removable sections are equipped with steel hooks in their sides to permit setting them in place after removal of the narrow gage railroad or for future removal to permit repair work along the shore. Construction of the five flumes required 3,500 b. ft. of lumber.

As a precaution against damage to the railroad roadbed from excessive storm water, 3,650 lin. ft. of No. 8 ga. interlocking corrugated steel sheeting, 8 ft. long, was driven between the eastbound main line and the collector ditch at the toe of the 30-ft. bluff.

The sheeting was driven by airhammers in two operations. First operation was to place it in correct position and drive it to a firm toehold. A second hammer then followed along and drove it to a 5½-ft. penetration. Original designs contemplated stiffening the line of sheeting by welding an angle along the top. This method was discarded, however, in favor of welding a half-section of sheeting at 18-ft. intervals to form a stiffening T-section.

Protecting the shore line

Although protecting the railroad embankment from storm water was an interesting operation, and constructing the fill itself involved the placing of a large quantity of material the real problem, from an engineering viewpoint, was to safeguard the shoreline and toe of fill from destructive wave action of Lake Michigan.

Located on the southeastern shore of the lake, this particular site bears the brunt of enormous waves during stormy weather. Accordingly, the railroad engineers spared no effort to obtain a system of piling and jetties that would withstand any probable storm.

Basically, the shoreline protection

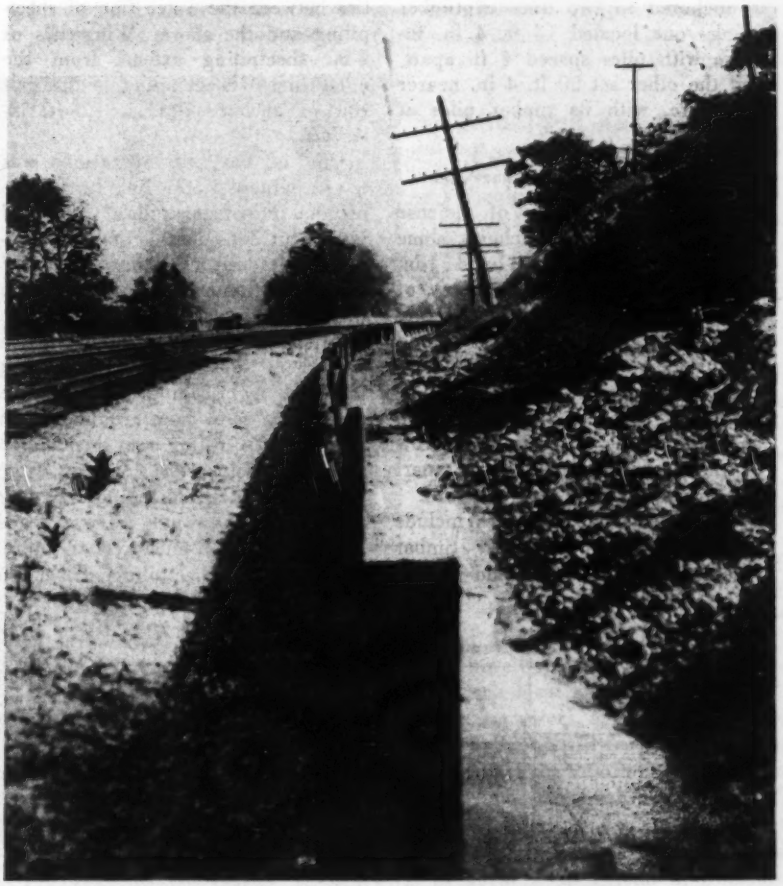

Fig. 2. Protecting the railroad roadbed from recurring surface water on the land side required a wall of corrugated sheeting with T-stiffeners.

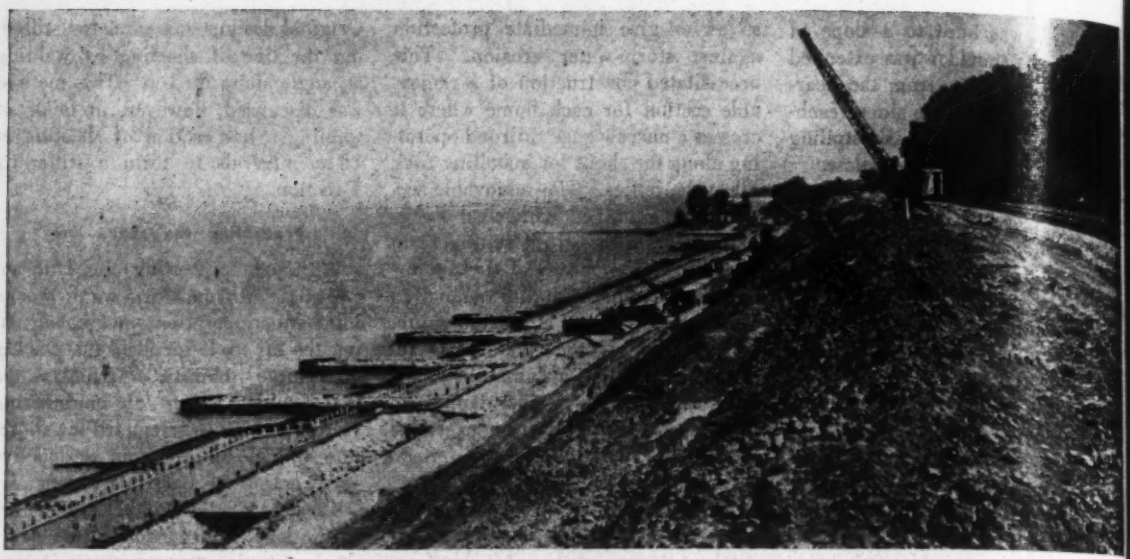

Fig. 3. Benches were excavated along the face of the new fill to prevent sliding. The steel sheetpiling and jetties at the left will break up the wave action to prevent erosion at the toe.

is made up of 4,200 lin. ft. of ⅜-in. thick steel sheetpiling, of which 1,550 lin. ft. had been installed some twelve years ago. The top of sheetpiling is anchored to two lines of timber piling—one located 13 ft. 4 in. inshore with piles spaced 4 ft. apart, and the other set 20 ft. 4 in. nearer the shore, with its timber piles at 12 ft. c. to c.

Corrugated sheets in inner line

The secondary line of defense against wave action includes some 1,700 lin. ft. of second-hand ⅜-in. steel sheetpiling and 1,300 lin. ft. of new 8-ga. corrugated steel sheeting located 20 ft. inshore from the second row of anchor piles. Its sections are 16 ft. long, driven to provide a 6-ft. freeboard above lake level and anchored at the top to a single row of timber piles spaced 4 ft. apart and driven 20 ft. 4 in. shoreward.

Other protective measures include 700 lin. ft. of rock-filled timber revetment at the south end of the job and nine rock-filled jetties extending 50 ft. into the lake beyond the outer line of sheetpiling. In addition, there are eleven smaller jetties between the outer line of sheetpiling and the shore. Wingwalls of ⅜-in. sheetpiling extend from the outer line of steel piling to the first row of anchor piles, at 125-ft. intervals.

One of the first operations was to straighten 1,500 lin. ft. of the original line of sheetpiling, which had been bent considerably out of vertical by the destructive wave action of the lake. Some of it lay almost on the bed of the lake.

In straightening this piling, which was bent outward, it was first loosened by washing some of the embedding sand from around it with a water jet. Piling was then pulled back into line with a 5-part cable block and falls, bridled to the piles and attached through fairway leads to a large crane, anchored on shore.

All of the sheetpiling driven in the outer line was reconditioned stock secured from second-hand dealers, since limiting priorities prevented the use of new material. For the most part, it was furnished in 25-ft. lengths, and driven to about a 15-ft. penetration to provide a 2-ft. freeboard above lake level. Sheetpiling was jetted while being driven.

Tierods from old boxcars

Tierods for anchoring the sheetpiling and the corrugated sheeting to the timber anchor piles were salvaged from old boxcars. A 15-in. stiffening channel was welded on the inshore side of the outer wall and a 10-in. channel on the secondary wall. Timber pile wales were bolted to the anchor piles to engage the tierods. All nuts on the tierods were welded after being tightened to prevent them from working loose. Reinforcing and anchoring of the sheetpile line is required only to resist outward pressure developed as water, and eventually silt, create an unbalanced head as water outside recedes.

Additional stability is provided for the secondary wall by constructing a 5-ft. high rock fill, built to a slope of 1 on 1½, on the shore side. T-sections also were welded to the lightweight sheeting at 18-ft. intervals.

The same rugged construction was used in the 16-ft. wide rock-filled jetties as that employed in the other shore protection installations. Two lines of 20-ft. timber piling form the sides. Timber pile struts and

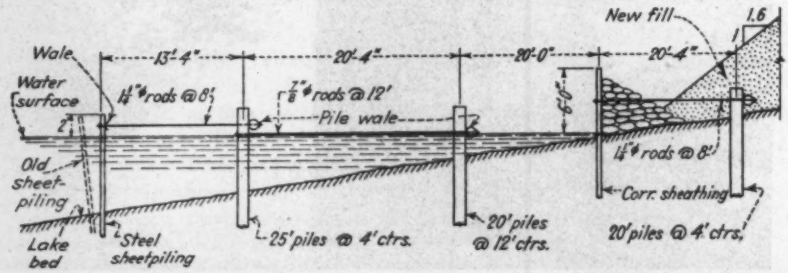

Fig. 4. Two lines of timber piling anchor the outer line of sheetpiling, while the inner line is bulwarked with a rock fill.

steel tierods placed near the top of piling give added stability. Each of the double rows of piling has the intervening space between piles completely filled with 15x15-in. x 3-ft. precast concrete blocks. Heavy stone riprap was placed between the two double rows of timber piling.

A semi-circular timber framework forming the nose of the jetty also is filled with stone riprap. All jetties are protected with second-hand ⅜-in. thick steel sheetpiling about 25 ft. long and driven well into the bed of the lake. The top of the jetty proper is 3 ft. above lake level, while the sheetpiling extends one foot higher.

Added protection was given each jetty by driving a row of timber piles 6 ft. outside of and encircling the jetties on their three exposed sides. This piling, spaced 2½ ft. apart, was driven slightly below lake level. Of the nine main jetties extending out into the lake, three are located 100 ft. apart at the north end of the job, five are spaced 100 ft. apart near the center, and one is near the south end of the work.

Some 21,000 tons of stone riprap used in jetties and revetments, and to stabilize the line of corrugated steel sheeting along the shore line, was hauled by train from Quarry, Mich. An unloading spur was built out from the westbound track near the south end of the job.

Rock was unloaded from the cars with a crawler crane which cast it over the bank where it rolled down onto the beach. There it was loaded by clamshell into 1½-cu. yd., side-dump cars operating on a narrow gage railway constructed along the beach. Upon reaching their destination, the rock-cars were picked up by crane and the riprap was dumped directly into place.

Throughout the job, work continued on a 54-hr. week basis. When rough weather prevented working along the edge of the lake, activities were confined to other parts of the job. An average of 60 men was employed during most of the work.

Magnitude of the job

Some idea of the magnitude of this $1,500,000 construction job is obtained from the fact that 950 cu. yd. of concrete were used in making the precast blocks in the jetties; 93,000 lin. ft. of native untreated timber and 42,000 lin. ft. of creosote treated timber piling were required to build the shoreline protection and to anchor the timber flumes on the face of the fill.

A total of 750 tons of ⅜-in. steel sheetpiling was driven, and 60 tons of steel tierods, salvaged from old box cars were used in building the wall and jetties.

Engineering personnel

John T. Kelly, vice president of the Jutton-Kelly Co., Detroit, contractors on the job, was in direct charge of the work. R. L. Evans was his construction superintendent, and Merritt E. Johnson was engineer-office manager.

Designs were prepared and all work was done under the direct supervision of O. E. Hager, engineer of bridges and structures, Pere Marquette Railway Co. H. A. Cassil is chief engineer, and T. F. Burris is division engineer. S. L. Wagner and Ralph A. Smith were resident engineers on construction.

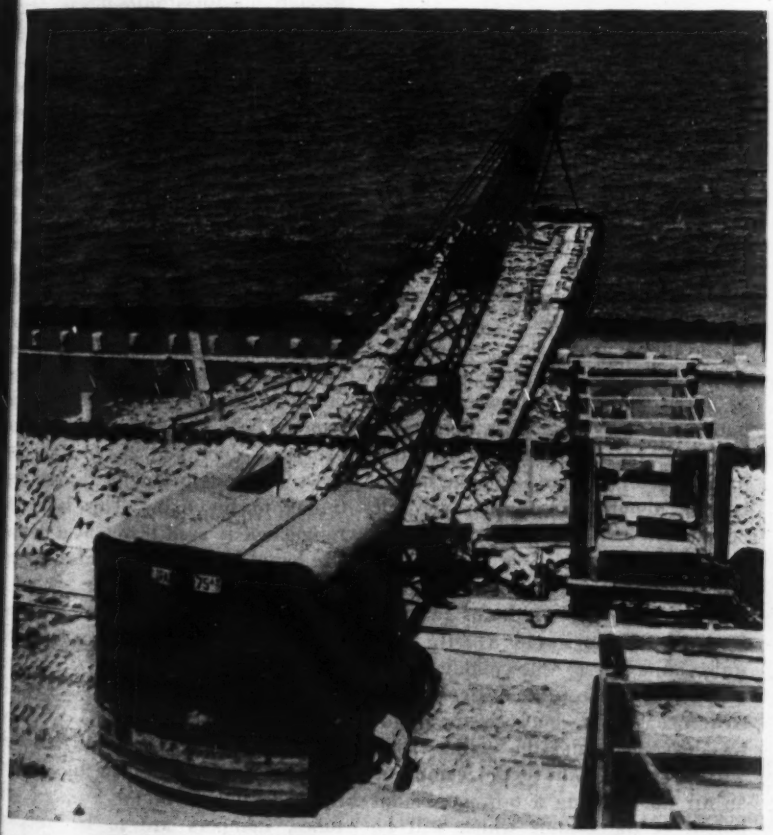

Fig. 5. Timber flumes had removable sections to permit operation of a narrow-gage railroad for hauling rock. Jetties extend well out into Lake Michigan.

Michigan has $250,000 For Airport Planning

Michigan has set up a statewide airport development plan to facilitate the gradual expansion of airport facilities as recommended by the Michigan Board of Aeronautics.

Municipalities, townships and counties will have immediate access to $250,000 for use on survey and design of new airports and extensions of existing airports, subject to approval by the board of aeronautics, the American Municipal Association reports.

Allocations from the special $250,000 postwar fund will be made only to an authorized governmental agency, with any of the remaining money from the allotment going into a general fund for construction incidental to the development of the program.

Each local agency will furnish its own surveyors, engineers and airport designers or will recommend an engineering firm to contract for the job, subject to approval by the board. To be eligible for state appropriations, the applying municipality must have in advance an official appropriation constituting its share of construction costs.

New Ventilating System Designed For Penn-Lincoln Parkway Tunnel

Wayne D. Meyers and James I. Rooney
Project Engineer and Chief Tunnel Engineer, Penn-Lincoln Parkway
Michael Baker, Jr., Consulting Engineer, Rochester, Pa.

***Contents in Brief**—A system of vehicle-tunnel ventilation combining the economies of longitudinal ventilation with the safety features of transverse ventilation has been developed for use in the Squirrel Hill Tunnel, a major element of the projected Penn-Lincoln Parkway at Pittsburgh. Designs are being pushed so that construction can start when war restrictions are lifted.*

PLANS are now being pushed to completion for the Penn-Lincoln Parkway, a four- and six-lane expressway extending from Pittsburgh's "Golden Triangle" to a point east of the borough of Wilkinsburg, a distance of a little over nine miles. The parkway is designed to give downtown Pittsburgh much more direct connections with the Lincoln and William Penn highways east of the city. Farther to the east, the Lincoln Highway connects with the Pennsylvania Turnpike.

A major element of the Penn-Lincoln Parkway and one of the first parts that will be put under construction when the ban on new construction is lifted, is a twin-tube vehicle tunnel under Squirrel Hill in the Pittsburgh suburban area. This tunnel will be characterized by some innovations in vehicle-tunnel design, most noteworthy of which is the system of ventilation.

Because the Penn-Lincoln Parkway was set up as one of the early postwar projects of the Pennsylvania Department of Highways, the highway department last year decided to engage outside engineers to do the design work. In December, 1943, John U. Shroyer, secretary of highways, let a contract for completion of the plans in a period of ten months to Michael Baker, Jr., Rochester, Pa., who in turn engaged George S. Richardson of Pittsburgh to design the bridges and Ole Singstad of New York as consultant on the proposed tunnel under Squirrel Hill. This design work is being carried forward under the direction of E. L. Schmidt, district engineer of the highway department.

Twin two-lane tunnels

Squirrel Hill Tunnel will be made up of two similar tubes, each providing for two 12-ft. traffic lanes. The tubes will be 4,225 ft. long, parallel to each other, with a constant grade of 2.5 percent, falling from west to east. The transverse distance between the centerlines of the tubes will be 60 ft., with a 30-ft. thick rock pillar support between the adjacent walls of the two tubes.

The tunnel overburden varies considerably in depth, with a maximum of about 250 ft., and except for a nominal earth topping is composed of stratified shale, sandstone and limestone formations. For the major portion, about 3,800 ft., each tube will be entirely in rock, and the cross-section shown in Fig. 3 is to be used. The lower part, rectangular in shape, provides sufficient width for two 12-ft. roadway lanes and a 3-ft. sidewalk adjacent to the middle rock support between tubes. Its vertical clearance height, between the roadway pavement and the ceiling slab, will be 14 ft. Above the ceiling is an air duct having a 6-ft. maximum height at the center, which will be used for ventilating purposes.

The system of ventilation devised for these tunnels by Mr. Singstad marks a distinct advance in vehicle tunnel ventilation in that most of the economies of longitudinal ventilation are retained without sacrifice of the safety factor provided by the so-called transverse system of ventilation that was developed originally for the Holland Tunnel at New York. In that system air is supplied continuously from a duct below the roadway and rises vertically to be drawn off through openings into the overhead exhaust duct.

Fig. 2 shows the general outline of the system to be used in the Squirrel Hill Tunnel. In the first half of each tube as a vehicle enters, fresh air is drawn in with the vehicle through the tunnel and vitiated air is drawn out through the overhead duct. The size of openings into the duct is adjusted to draw increasing amounts of air from the tunnel as the distance from the portal increases. Beyond the midpoint in the tunnel conditions are reversed. From the midpoint to the exit, fresh air is pumped into the tunnel through the overhead duct and the exhaust air flows out longitudinally through the tunnel to the exit. This latter arrangement is used throughout the entire length of the tunnels of the Pennsylvania Turnpike.

In case of fire in a section of tunnel ventilated by this arrangement of feeding fresh air from above, the smoke and fumes spread longitudinally through the tunnel instead of being drawn off through the overhead duct. To eliminate this hazard in the exit half of the Squirrel Hill tubes, dampers are to be installed between the exhaust and supply ducts in the ventilation buildings. At word

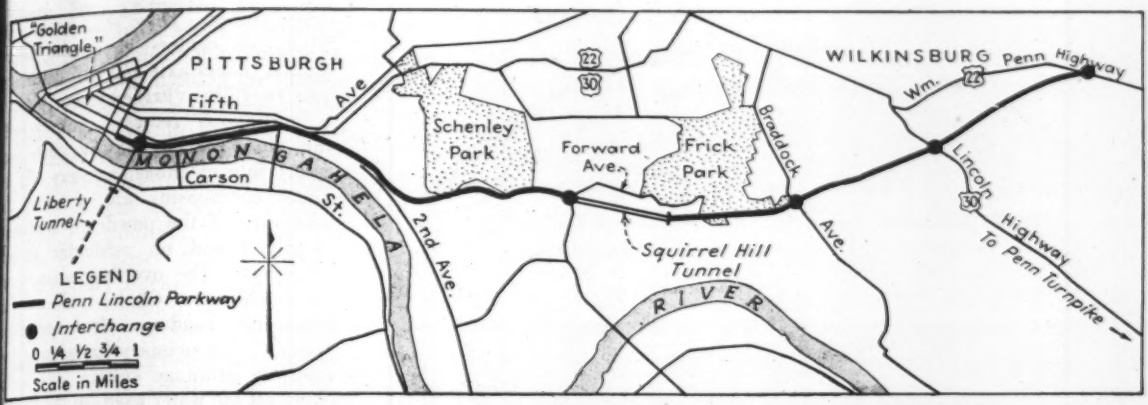

Fig. 1. Route of the proposed Penn-Lincoln Parkway showing the location of Squirrel Hill Tunnel. The parkway will provide a better connection between the William Penn and Lincoln highways east of Pittsburgh and the heart of the downtown business district. Traffic from the Penn Turnpike will use the same route.

from the tunnel police that there is a fire in the exit half of one of the tunnels the operator can throw this damper, reversing the flow. Thus the smoke will be drawn off through the overhead duct until the fire is extinguished.

This improved method has been characterized as the "reversible transverse-longitudinal" system of ventilation in patents that have been applied for.

To keep a head-on wind from stopping the outflow of air from the exit ends of the tubes, air traps similar to those designed originally for the Liberty Tunnels at Pittsburgh are to be used at the exits of the Squirrel Hill tubes.

These air traps will be made an integral part of the ventilating building, as indicated in Fig. 2. They consist of wide roof openings over the exit roadways in the two-storied, 37-ft. long, portal-front extension to the ventilation building proper. With wind conditions such that they act directly against the outflowing air from the exit tunnel mouths, the air-trap openings will function as ports, permitting the head-on air currents to be deflected tangentially upward, thus eliminating the possibility of a static air condition developing in the tunnel.

As no air trap is needed at the entrances, the opening between the portal wall and the ventilating building is to be roofed over with glass block. This shaded zone will also form a part of the transition lighting zone during daylight hours.

Ventilating buildings

The two ventilation buildings are located in residential areas and one of them lies adjacent to Frick Park. With this in mind, an appropriate exterior finish for the buildings will be used in order that they may harmonize with their settings. The two buildings will be similar in size and layout above the tunnel roadway level. Below this level conditions at the sites control the details.

At the west portal the tunnel structure will be higher than the existing ground surface with the result that the supporting structure for the tunnel plaza will serve to carry the parkway over a main city thoroughfare. Immediately west of the plaza, the parkway passes through an important interchange. At the other end of the tunnel, at the east portal, the tubes will emerge in a ravine and the parkway then will pass over a long bridge above Nine Mile Run valley.

The tunnel tubes will extend through the lower section of the ventilating buildings and between these tubes in the height equivalent to the tube sections will be two floors, which will be used for the tunnel operating and servicing quarters. In the rear portion of the building over the tunnels two more floors will be added, the lower or third floor to be used to accommodate the electrical equipment such as transformers, switchboards, etc., and the upper or fourth floor to house the ventilation units, composed of two blower and two exhaust fans. Louvres will be placed in the rear and side building walls. They will serve as air intakes

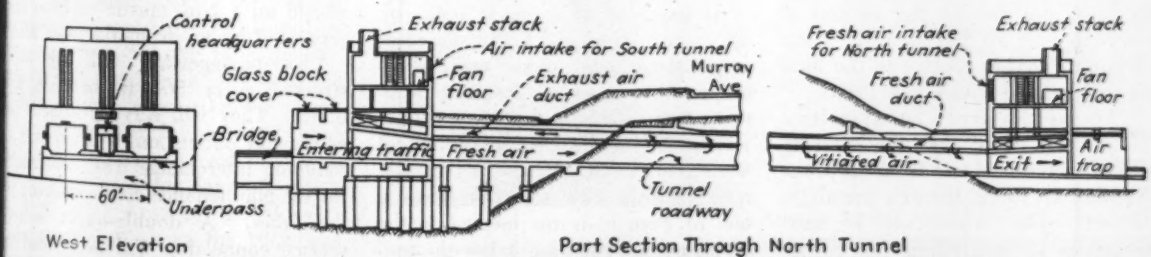

Fig. 2. Profile along one tube of the Squirrel Hill Tunnel. In the left-hand half of the tube here shown, fresh air is drawn into the tunnel with the entering traffic and vitiated air is drawn out through the overhead duct. Beyond the center point, fresh air is supplied from the overhead duct and vitiated air is carried out through the tunnel.

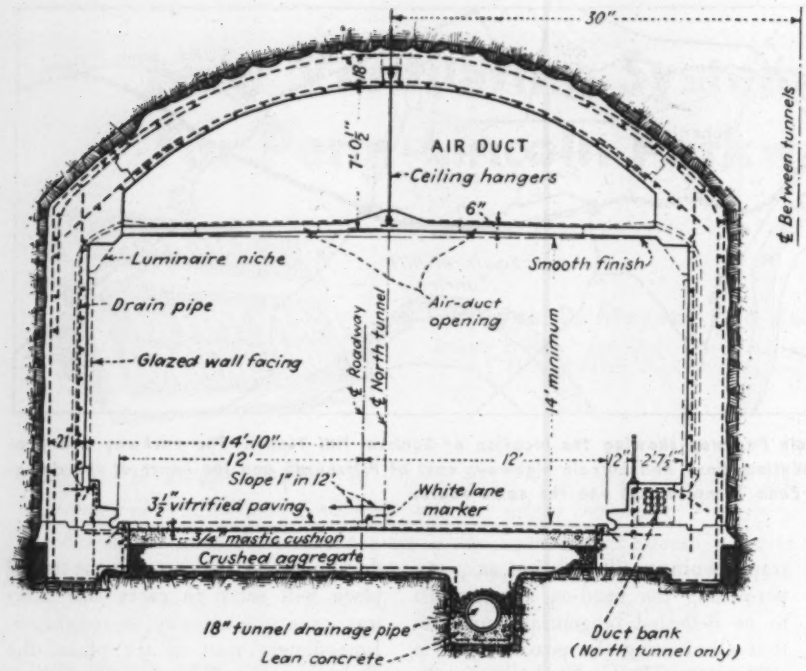

Fig. 3. Typical cross section of the North tube of the Squirrel Hill Tunnel. There are two such tubes, parallel and on 60-ft. centers. Cross passage-ways are to be cut at 500-ft. intervals.

for the fresh air supply to the blower-fan units. The vitiated air from the exhaust fans will be ejected through stacks extending above the roof.

The control center for tunnel operations will be on the second floor of the west ventilation building in the air-trap structure, overlooking the plaza. Ventilation and tunnel lighting systems, also plaza and traffic signals will be controlled from this point. It will also serve as the central exchange for the telephone and fire-alarm systems.

Several protective and traffic servicing systems will be installed. Tunnel air conditions will be recorded by carbon-monoxide analyzers, which will register automatically in the control room the amount of carbon-monoxide in the tunnel air. The control operator will be able to adjust the fans, and thereby the amount of ventilating air, so that the ratio of the carbon-monoxide content to the total air will be held within safe limits.

[Air samples are to be taken from the exhaust ducts over the entering half of each tunnel and from the lower roadway area near the exit portals in the exit ends. These will be used as guides in controlling fan speeds to maintain the maximum carbon-monoxide concentrations below 2½ parts per 10,000, which concentration has been found in tunnel operation to be more satisfactory than the safe maximum of 4 parts per 10,000. Tunnel operating experience has shown that haze developed above the 2½-parts point which was undesirable from a psychological viewpoint though doing no physical injury.—EDITOR.]

Details of the tunnels

The tunnel lining, made up of the vertical side walls and the top segmental arch, will be of reinforced concrete with a maximum thickness of 2 ft. On the natural bedrock at the bottom of the section a 12-in. layer of crushed aggregate will be placed for subgrade drainage. A concrete base to support the brick wearing surface will be constructed on this crushed-aggregate drainage course.

At the base of the side walls, on the exterior side, and below the roadway plaine, continuous crushed-aggregate drains will be installed to intercept any water at this level. Ports will be left in the base of the tunnel walls every 50 ft. to connect these exterior drains with an extensive system of French drains located in the 12-in. porous sub-base below the tunnel roadway slab. These transverse drain pipes will be 8 in. in diameter and will run for the full width of the tunnel tubes. They will be located 50 ft. on centers along the longitudinal tunnel axis and will discharge into an 18-in. vitrified sewer pipe.

Continuous recessed gutters will run along each roadway curb and empty into catchbasins every 400 ft. These catchbasins are provided to take care of the powdered sediment usually found on vehicular tunnel roadways. The overflow pipes from the catchbasins will be tied into the transverse roadway drainage pipe system. The primary function of the roadway drainage system will be to carry off the water used by the servicing crews in washing down the tunnels. The parkway grades adjacent to the tunnel portals are so designed as to keep any surface water from draining into the tunnel.

Measures are to be taken to insure a watertight tunnel structure. The tunnel lining has been designed to withstand high grouting pressures so that high pressures can be used to consolidate all rock formations outside the lining. All joints in the walls will be provided with waterstops and drains as an added factor against water percolating through the walls.

The interior surfaces of the tunnel walls below the ceiling will be finished with a glazed structural facing designed to give the tunnel interior an attractive appearance and to increase the lighting by its reflecting qualities. It will also serve to simplify the maintenance problems as it is more easily cleaned. Between the facing and the concrete tunnel walls a corrugated cement-asbestos sheeting will be placed, with the vertical corrugations adjacent to the wall left open in order that they may function as a wall drain to carry off any seepage through the adjoining walls.

Tunnel paving and lighting

A de-aired brick pavement will be used in the tunnels, the brick being placed on a ¾-in. mastic cushion and separated by an asphaltic joint filler.

Cross-passageways will be constructed every 500 ft. between the tubes. They will serve primarily as emergency outlets and will also aid in reducing interchange travel distances for the maintenance crews working in the tubes. A double-outlet water-service connection will be placed in each cross-passageway for servicing crews flushing either of the tubes. Water will be obtained through 4-in.

branch lines connected to a 6-in. water service main, which will extend for the full length of the south tube.

Luminaires for lighting the tunnels will be placed on both sides of the roadway in coves in the side walls just below the ceiling. They will be so set as to minimize shadows and give the greatest amount of diffused lighting. In addition, at each portal in the tube where traffic enters, a supplementary intensive lighting system will be installed for a distance of 250 ft. This system will produce lighting effects so graded that autoists will be able to adjust their vision gradually from the natural light outside the tunnel to the typical lighting in the tubes. Only during the periods of the daytime when the sunlight is intense will this supplementary system be thrown into use. Eye adjustment will be further facilitated by the air-trap structures.

Telephone, fire-alarm, and loudspeaker stations will be located at regular intervals in the tubes, and in the plazas. They will be connected with the control center in the west ventilation building, enabling the police patrol force to be called immediately into emergency service. Fire-extinguishers will be liberally spaced throughout the tubes and located to be readily accessible. Other protective devices, which will be installed, will include traffic lights, signal bells, maximum vehicle vertical clearance signals and traffic signs.

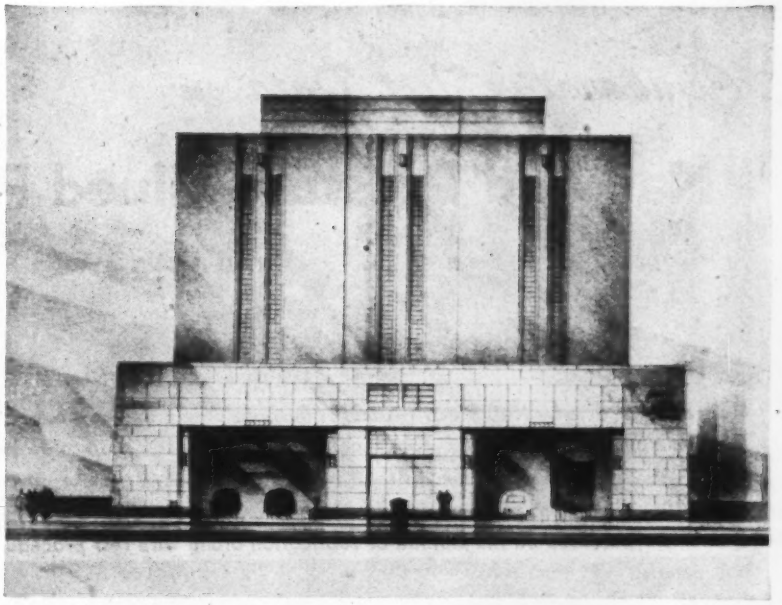

Fig. 4. In front of each ventilation building is a structure that forms an air trap at the exit end of each tube to keep head winds from interfering with the ventilation system.

Novel Schemes for Handling Rock

Three unusual methods of rock handling were developed in connection with an emergency flood control project on the Boise River in Idaho.

Hard and sharp black basalt, weighing 140 to 170 lb. per cu. ft. was found at a nearby slide area. A semicircular road around the toe of the slide was bulldozed out at truck-body level. Thus, big rocks could be rolled into planks and into the truck without cranes or other special loading equipment.

To bring some rock to the loading area, an idea was borrowed from logging operators. Six steel rails, the outside ones being 2 in. higher than the middle tracks, were extended down the mountainside for a distance of 00 ft. These made a skid road similar to that used for logs on which the rocks rode down to the trucks.

At the point where the rock was being used to check erosion, skips protected by ¼-in. steel plate were used to chute the rock under water into a toe-trench. A dragline distributed the rock below the surface. The steel plating, however, did not save the skips from destruction by the sharp basalt, and four skips were worn out during the job.

Sharp basalt blocks were dumped on steel plated skips to chute the bank-protection material into a toe trench below the water.

Gravel to build up the banks was obtained from the opposite shore, thus directing the force of the stream away from the weakened point where the stream had flooded and cut a new channel.

Work on the $200,000 project was under supervision of the Portland District of the U. S. Engineers. Survey crews were under Col. Ralph A. Tudor, district engineer. Supervision of construction work was handled by Capt. John L. Hoffmann, resident engineer and Wilfred A. Welch, assistant resident engineer.

J. A. Terteling & Sons of Boise, Idaho had contracts for handling the rock and H. A. Gardner of Blackfoot, Idaho, did the revetment and gravel embankment work. Robert Ross was superintendent and Gene Hill assistant superintendent for Terteling. Dexter and Roscoe Gardner were in charge of the Gardner work.

Comparative Test Data on

Nail-and Pressure-Glued Plywood Beams

David Countryman
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***Contents in Brief**—Nail-glued beams, using both casein and low-temperature phenolic glue, averaged 87½ percent as efficient as shop-fabricated beams that had been assembled with pressure gluing. This is the overall conclusion resulting from tests made on beams 25 ft. in length and 24 in. in depth. Details are provided on the method of fabrication along with test procedures and results.*

A MATTER OF INTEREST in the field of glued laminated construction has been the controversy regarding the effectiveness of nailed gluing compared with pressure gluing. By "nailed gluing" is meant a process in which the only pressure for maintaining contact between adjacent wood surfaces while the glue is setting is that exerted by nails. In "pressure gluing" an external form of pressure is used (such as hand clamps, screw or hydraulic presses) so that the joint is formed under a fairly uniform pressure. In general, nailed gluing is associated with site fabrication, whereas pressure gluing is more likely to be employed in a commercial fabricator's shop where specialized equipment is available, and closer control of other gluing conditions is more readily attainable.

Objections to nailed gluing are that the joint strength is likely to be somewhat erratic; the amount of pressure developed by the nails is relatively low, so that if an occasional board is twisted or is irregular in thickness, an open spot in the glue joint may occur. For this reason nailed gluing may not be suitabl where thick material is to be glued where a considerable degree of curv ture is desired in the member. Ho ever, it has proved successful wh used under suitable conditions.

Recently the Douglas Fir Plywoo Association research staff made tes to determine the relative strength fa tors of nail-glued and pressure-glue plywood beams. These tests were pe formed in the University of Washin ton Timber Testing Laboratory wi the cooperation of Prof. Bror Gro dal of the College of Forestry. So of the results are given in this artic and copies of the report on the co plete testing program on thirteen fu size plywood beams are availab from the Association, Tacoma Bld Tacoma, Wash.

Test specimens were beams of 25- length and 24-in. depth, having thr

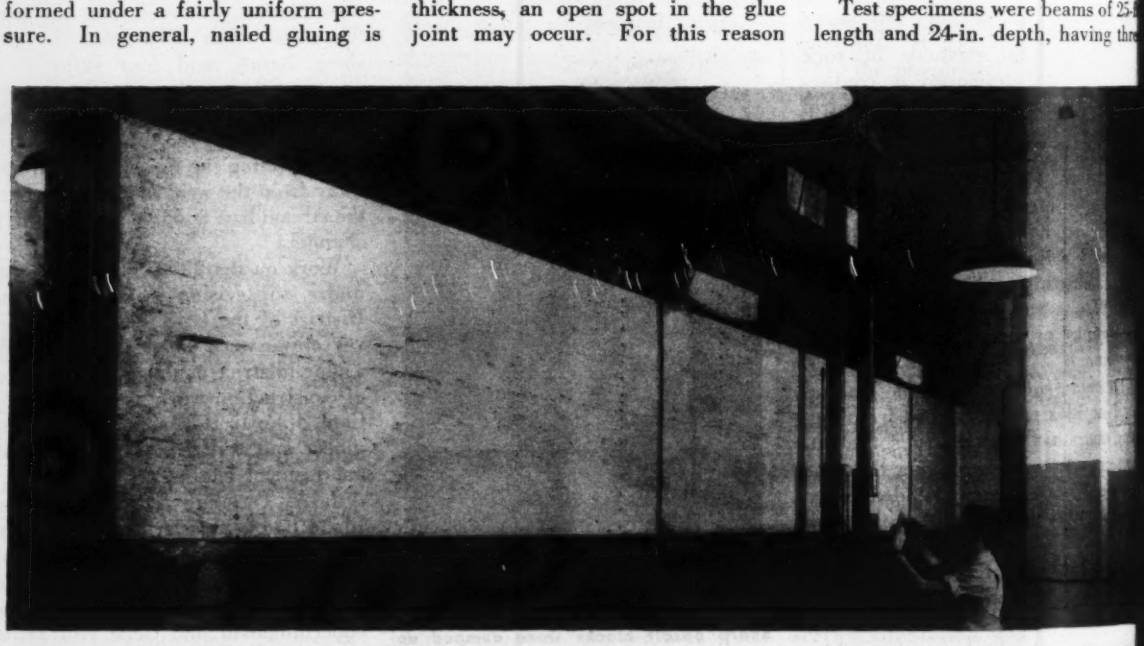


Fig. 1. Plywood beam of the type described in the article being made ready for testing in the 200,000-lb. Olsen t machine at the University of Washington. The load is applied at the third-points of the 24-ft. span by means of a t ber distribution beam.

rtical plywood webs and flanges minated from 1x6-in. clear Douglas lumber. Two beams (Nos. 7 and were built in a commercial shop ing customary laminating techques, and two similar beams (Nos. and 10) were built by field methods construction.

Method of fabrication

In order to make efficient use of the mber the flange material obtained Beams 7 and 8 was 1x6-in. rough y, Douglas fir, C clear grade. As ere was considerable thickness varition, the pieces were dressed to a iform $\frac{7}{8}$ in. They were then scarfed d glued to full length, the glue was owed to set, and the pieces were en dressed in a planer to $\frac{3}{4}$ in. so as eliminate the possibilities of open nts around the scarfs. Following s the four pieces of $\frac{3}{4}$x6-in. lumber ich comprised each flange were run ough a glue spreader and clamped a press. After curing, the 6-in. dinsion was surfaced both sides to in. Casein glue was used throughout.

The webs were butt-jointed with ice plates over the joints to full gth. Gluing pressure on the splice tes was obtained by nails only, beuse the time element made it desirle to handle the webs before the e had set.

Top and bottom flange members g in the same vertical plane were ed by toe-nailing with their tical stiffeners. Thus there was med an open lumber frame, capaof being handled as a unit. When final assembly of the beams was rtaken, the parts consisted of a ber of full-depth laminations, g alternately a plywood web and mber frame.

These laminations were first asbled dry to ascertain that the asbly would proceed satisfactorily, the areas to be glued were marked with pencil. The laminations e then separated for the applica of a heavy spread of handshed glue, and the pieces were laid on the press. The No. 7 beam reed plywood shims of a width al to the flange depth and a thick equal to the splice plates to be ed on the press boards.

Pressure was applied with pairs of . tie bolts spaced about 18 in.; bolts extended between wooden s members that were laid across

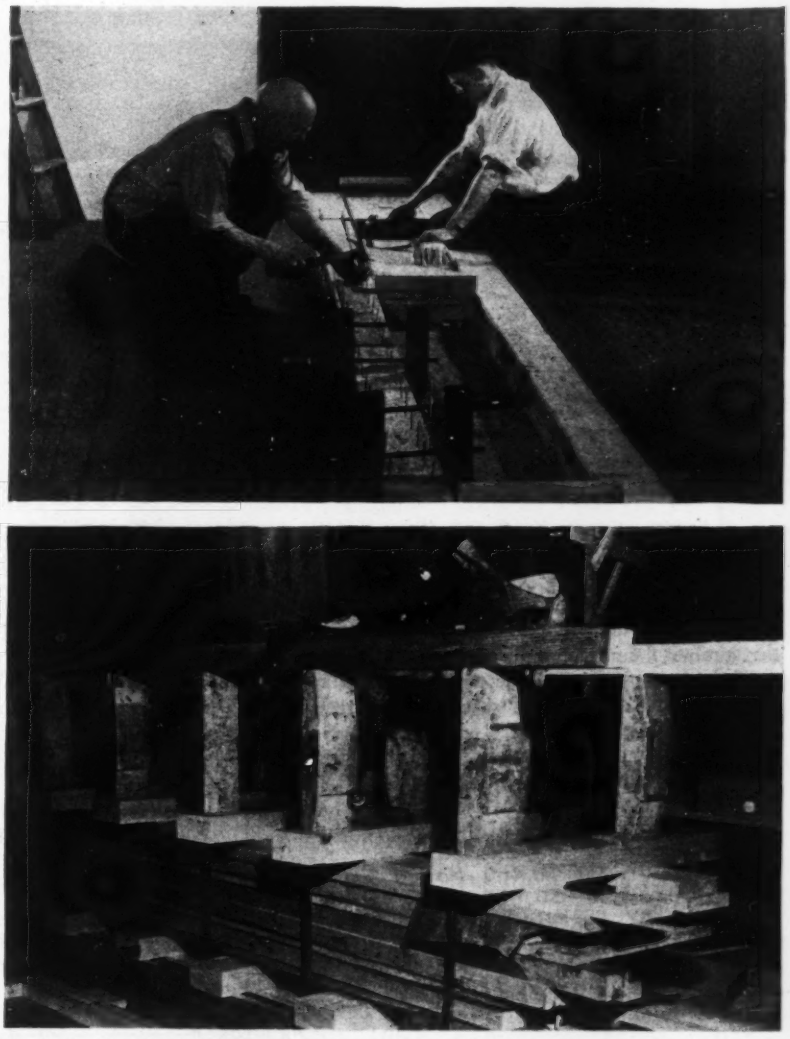


Fig. 2. Fabrication of Beam No. 9 (top), showing the manner in which the nails were placed after application of glue to the laminations. The bottom view shows the assembly of the screw-bolt press that was used for the fabrication of Beams 7 and 8.

2x10-in. press boards. Closed assembly times were less than one hour for each beam. Pressure periods were 48 hr. followed by four days storage; following this the beams were shipped to the testing laboratory, where they were stored two months indoors prior to testing.

Beams 9 and 10, which were built in the Association laboratory, were similar in dimension to 7 and 8 respectively. They were modified, however, so as to be adaptable to field fabrication methods, where the usual equipment employed by the commercial fabricator for scarfing, surfacing and pressing, might not be available. For this reason the individual flange pieces were simply butt-jointed, with the joints staggered according to a pre-determined schedule. In this way only one-eighth of the flange area was missing from any given cross-section and the minimum distance between such cross-sections was 12 in. along the beam. The lumber was used as received from the mill, surfaced four sides, and the gluing pressure was obtained with nails. The only power tool used was a saw.

The webs were joined with splice plates, the glue being set with nails. The flange lumber was dry 1x6-in. Douglas fir, C clear grade, surfaced four sides; it was cut to lengths for correct positioning of the joints.

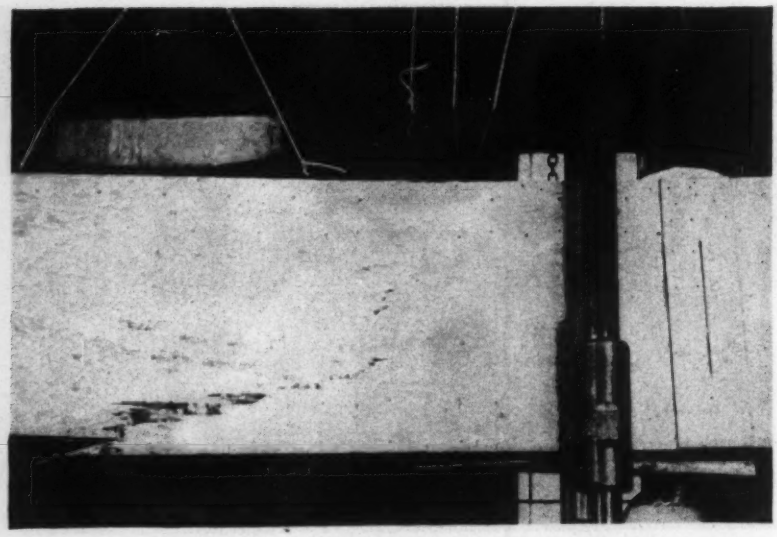


Fig. 3. Failure of Beam No. 9. This shows that the break occurred in the lumber and was well distributed along the beam.

In laying up the beam, glue was brushed on both contacting faces of the lumber flanges, and 8d common nails driven so as to provide one nail shank for every 8 sq. in. of glue area. The latter was easily accomplished by placing two lines of nails down each 6-in. face, spacing the nails at 6 in. in each line. A template was employed to stagger the nails, thus increasing their effective pressure and decreasing the likelihood of splitting.

Flange pieces were held square and in line as they were laid up by means of hand clamps. When a top and bottom flange had been glued, the vertical stiffeners were inserted between them, toe-nailed, and the center web glued on. The process of building up the flanges was continued, the stiffeners set in and the outer web nailed on, then the beam was turned over to add the other outside web.

Casein glue was used for Beams and a low-temperature phenolic glue for Beam 10. The air temperature was very close to 70 deg. during and after gluing operations. Both lumber and plywood had been seasoned under similar conditions for several days previously, and both had been dry to start with, so they were virtually at equal moisture content. Both of the finished beams were stored indoors for about three months prior to testing.

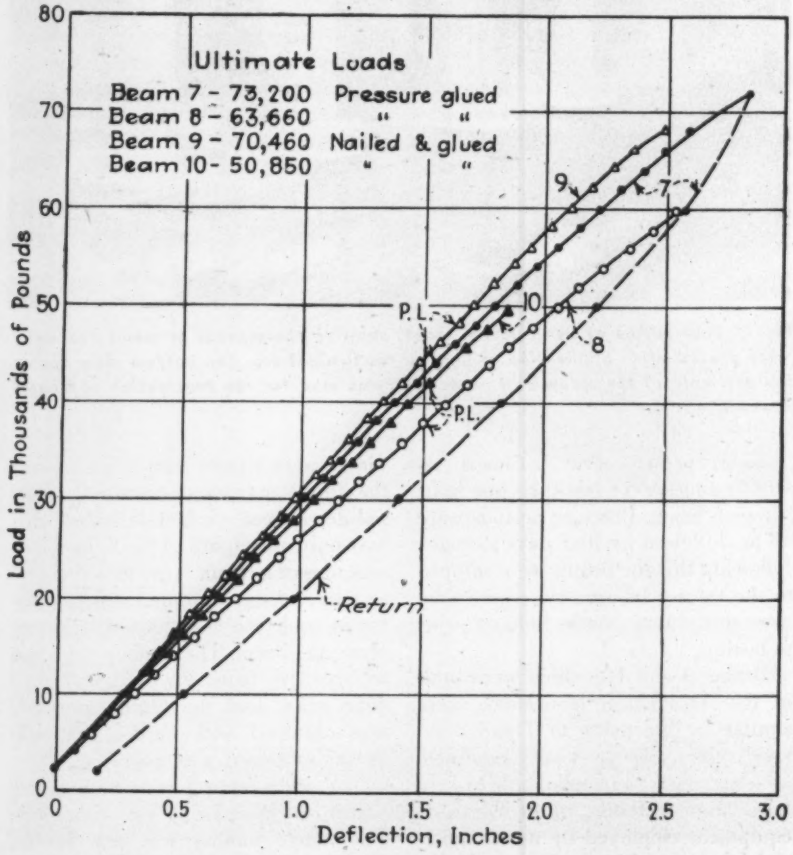


Fig. 4. Load-deflection curves resulting from tests on the plywood beams. Differences in rate of deflection for each beam are attributed to differences in cross-sectional dimensions as built, moisture content being identical in each case.

Test methods and results

Load was applied in a 200,000-lb. Olsen testing machine whose bas normally 16 ft. long, was extended with a large timber to accommoda the 25-ft. beams. Provisions of th A.S.T.M. regarding the testing large sized timbers were observed i sofar as possible. Load was applie at the third-points of the 24-ft. spa by means of an 8x10-in. timber di tributor beam, which rested on th curved bearing blocks. Center de flections were read through an engi neer's transit from a scale fastened the beam at midspan with the aid of wire attached to the beam at the neu tral axis over each support.

The test results are shown in th accompanying load-deflection curv and in the table.

When the ultimate load on Bea No. 7 was reached, as evidenced b refusal of the beam to take any mor load, no apparent fracture had take place, so the load was backed off an deflection readings were taken on th return. At the initial loading poi the beam had recovered all but 0.1 in. of its 2.85-in. deflection, an inte esting illustration of the relative elastic action of wood even wh stressed to its ultimate.

Beam No. 9, which was matche with No. 7, was slightly stiffer, had slightly higher proportional limit, b a modulus of rupture equal to 9

percent of that for No. 7. First failure occurred in the outer layer of the compression flange beside a butt joint in an adjoining lamination. Tension failure followed in the lower flange at a point 18 in. from the nearest butt joint. No appreciable failure occurred in the glue lines.

Beam No. 8 failed in the tension flange after taking 4½ times its design load and showing no peculiarities.

Beam No. 10, matched with No. 8, and glued with a low-temperature phenolic glue set at room temperature with nailing pressure only, sustained a load of 50,850 lb. before failing in the lower flange near a butt joint. A relatively small percentage of glue failure was noted. Although No. 10 was matched with No. 8, the latter had no butt joints at any cross section. So while the ultimate load of No. 10 was lower than No. 8, the design load was also lower and, based upon modulus of rupture, No. 10 was 85 percent as effective as No. 8. The proportional limit of No. 10 was somewhat lower than that of No. 8, but it was slightly stiffer than the latter.

The differences in rate of deflection between No. 7 and 9, and 8 and 10, respectively, is due probably to differences in the cross-sectional dimensions as built, moisture content being nearly identical. Moments of inertia of Beams 9 and 10 averaged 6 percent higher than those of 7 and 8. The fact that the nailed girders are stiffer than those without nails is not attributed to any action of the nails themselves. It is also interesting to note that the presence of butt joints evidently does not reduce the stiffness of the beams.

In the accompanying tabulation, Col. B gives the weight of each beam at time of test. Cols. C and D give the net moments of inertia about the horizontal axis and the gross moments of inertia about the vertical axis, respectively. The net moment of inertia considers all continuous wood fiber parallel to the beam axis. Thus, if a cross-section contains a butt joint, the laminations so jointed are ignored in the calculations. However, when a plywood web joint was covered with splice plates the web was assumed to be continuous.

Test values check design

Net moments of inertia were used for calculating bending stresses. The gross moment of inertia considered all parallel wood fiber, jointed or not. The gross values were used for computing deflections, horizontal and rolling shear stresses and the ratios of horizontal to vertical moments of inertia of the center section, shown in Col. E and used as a criterion for lateral stability. All moment of inertia values shown were computed from measurements made of the beam at the time of testing. The proportional limit and ultimate load stresses, Cols. N, Q, R and S, were computed using the actual net moments of inertia as built; however, in the calculations for the design loads and deflection, Cols. G, H, I and J, the moments of inertia as taken from the design drawings were employed. The actual moment of inertia values agreed reasonably well with design values.

In Col. F are shown values of the form factor at proportional limit computed as described in Sect. 7 of the Association's *Technical Data on Plywood*. This factor was used in the flexure formula to compute the fiber stress at proportional limit, Col. N, and the design load in flexure, Col. G. In computing the fiber stress at ultimate load, the ultimate load form factor was used.

Values of the design loads as limited by the three critical stresses—flexure, horizontal shear and flange-web shear—were computed from the formulas given in the Association's laboratory report No. 27, *Structural Applications of Plywood*, Part I, pp. 20-21, and are listed in Cols. G, H and I. The smallest of the three values is the design load for the beam as a whole and has been italicized.

The design stresses in flexure were taken as 1,600 psi. but were multiplied by a factor of 10/9 in order to correct for a depth factor. This depth factor is applied in deriving the usual working stresses for lumber, but is covered again by the form factor, as noted in Sect. 7 of *Technical Data on Plywood*. The design shear stresses were 210 psi. and 26¼ psi. in horizontal and flange-web shear, respectively, these values corresponding to a So-2-S grade of plywood.

The design load deflections were predicted with the usual deflection formulas, taking shear into account. The elastic constants used were taken as the average for Douglas fir, but were modified for the actual moisture content of the beams at test. The average moisture content of the plywood was 8 percent, for which a shearing modulus of 130,000 psi. is appropriate. The moisture content of the flanges was also 8 percent for which a true elastic modulus of 2,100,000 psi. was taken.

The deflections were calculated

DESIGN DATA AND TEST RESULTS ON 25 FT. LONG PLYWOOD BEAMS

(The loads being applied at third-points of 24 ft. span. Beams 7 and 8 were pressure-glued and beams 9 and 10 were nailed and glued)

						Design Loads, lbs.			Deflect. at Design Load			Proport. Limit				Stresses at Ultimate			
Beam No.	Wght. lbs.	Ix As built in.⁴	Iy Ctr. Sec. in.⁴	Ix/Iy	Fpl	Flex	Horiz. Shear	Flange-Web Shear	Predict. in.	Actual in.	% Error	Load lbs.	Fiber Stress psi	Ultim. Load lbs.	Factor of Safety	Flex.	Horiz. Shear	Flange-Web Shear	Failure
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
7	680	C-6,605 E-7,015 Center 6,095 Ends 6,900	519	12.7	0.74	15,480	*15,400*	27,320	0.55	0.57	—4%	40,000	4,700	73,200	4.75	9,150	1,010	72	No observable fracture.
8	610	Center 7,010 Ends 7,386	565	13.6	0.74	15,480	*15,400*	27,320	0.55	0.55	0%	44,000	4,800	70,460	4.57	*8,390*	959	69	Failure in tension flange (not at butt joint). High % wood failure.
9	710	Center 5,832 Ends 7,355	315	20.8	0.73	*12,600*	15,400	27,320	0.48	0.48	0%	32,000	4,340	50,850	4.02	7,480	697	50	Failure in tension flange near butt joint. High % wood failure.
10	645																		

Tension flange failure under Loading point.

using the gross moments of inertia, including all filler material, but neglecting fibers whose grain was not parallel to the direction of principal stress. Where the sections varied, a weighted average moment of inertia was chosen with due regard for the bending moment and shear diagrams. The difference between the predicted and actual deflections in percent of the actual deflection is shown in Col. L.

The proportional limit load, Col. M, was determined from the load-deflection curves.

In Col. O is listed the ultimate load, which includes the weight of the beam itself, and in Col. P the factor of safety, which is taken as the ultimate load divided by the design load.

The computed stresses existing at the ultimate load are shown in Cols. Q, R and S and were found by the same equations used in obtaining the design loads. The type of stress in which failure occurred has been italicized.

Nail-glued beams, using both casein and low-temperature phenolic glue, averaged about 87½ percent as efficient in strength (based on modulus of rupture) as all similar shop-fabricated beams. This slight relative reduction in strength apparently was not attributable to a weaker glue bond in the nailed beams, but was probably related to the large number of butt joints and perhaps to a weakening effect of the closely spaced nails.

Despite the presence of about 25 butt joints in Beams 9 and 10, they were as stiff as the similar scarf-jointed beams. Thus where stiffness, rather than strength is the controlling design factor, it may not be necessary to require scarfed joints, although it is always preferable to do so.

The conclusion regarding the comparative strength of nail gluing and pressure gluing applies only to plywood beams and not to laminated lumber beams in general. The reason is that relatively small design shear stresses are currently recommended for plywood beams, the value being roughly one-fourth that for solid or laminated lumber of the same species. A further factor is that a comparatively small amount of assembly gluing is required to produce a plywood beam, so that the nailing can be completed within a reasonable assembly time.

Analyses indicate that even if there had been no glue used, Beam 9 and 10 could still have supported their design loads with the nails alone. In fact the allowable nail bearing values would have been exceeded by only 25 percent. This fact may be of importance to those who wish insurance against the possibility of glue failure due to exposure; again it is made possible by the low rolling shear design stress used in plywood beams.

Skid Prevention on Highways

Accidents due to skidding increased last winter, according to the National Safety Council, and may be expected to continue to rise this winter due to the condition of most tires now in service. As an aid to those concerned with prevention of skidding accidents the council has prepared for distribution a report by its committee on winter driving hazards, which is headed by Ralph A. Moyer, research associated professor of highway engineering at Iowa State College. The salient features of the committee recommendations with respect to skid prevention are given below. The full paper can be obtained from the council headquarters, 20 North Wacker Drive, Chicago, 6, Ill.

According to Prof. Moyer, available accident facts indicate that maximum safety on winter roads is provided when ice and snow are completely removed, leaving bare pavement surfaces. The two methods of bare pavement maintenance most widely used are: (1) prompt removal of all snow and (2) straight application of sodium or calcium chloride without abrasives on the snow-covered or ice-covered surface. After snow has fallen to a depth of about 1 in., the application of chlorides at the rate of ¼ lb. per sq. yd. of roadway will prevent the snow from bonding to the pavement and will keep the snow in a mealy condition, permitting easy removal by plowing.

To remove sleet or thin layers of ice or packed snow, the application of 300 lb. of sodium or calcium chloride per mile of two-lane roadway will generally be effective in melting snow and ice when the temperature is just below freezing.

The use of chlorides straight without abrasives is preferred by many maintenance departments because it requires less materials and labor and can be applied faster than when treated abrasives such as sand or cinders are used.

Another advantage of using the chlorides straight on city streets is the labor that is saved in the spring when the sand or cinders must be cleaned off the streets and out of the gutters and catch basins.

While bare-pavement winter maintenance provides maximum safety, many agencies are using the less costly method of applying abrasives on slippery, icy or snowy surfaces. Abrasives treated with calcium or sodium chloride at the rate of 50 to 200 lb. per cu. yd. are more effective in imbedding the abrasive and in reducing the skidding hazard than untreated abrasives. The chlorides also are necessary to prevent the abrasives from freezing solid where they are stored in open stock piles. The greatest amount of chloride is needed where the abrasive, such as cinders, contains considerable fine particles that absorb a large amount of moisture. For best results, about one-half of the chlorides should be mixed with abrasives when preparing them for the stock piles and the other half added when the trucks are loaded for distribution of the materials.

On portland-cement concrete pavements it is recommended that sodium or calcium chloride be used as sparingly as possible to prevent pools of brine from forming. It has been found that where these salts have been used too freely considerable surface pitting and scaling has developed. An important observation in this field is that unscaled concrete pavements more than four years old or made with air-entraining cements will not be affected by the salts.

On important roads, some type of treatment to prevent slippery, icy or packed-snow conditions from developing is highly essential. Where scaling of concrete is likely to be a serious problem, the use of untreated abrasives is recommended.

Bracing for Industrial Buildings

Arnold A. Weitzman
Engineer
Detroit, Michigan

IN SELECTING their methods of design, engineers should be guided by consideration of the physical action likely to take place in a material rather than by arbitrary prescription of its law of action. The material tolerates; it never obeys.

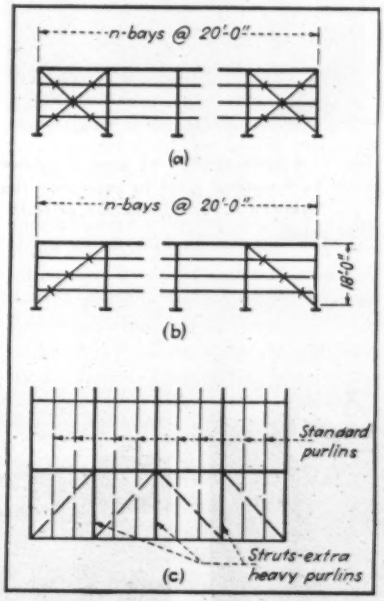
It is an established practice to use X-bracing for all wind and sway bracings. In most cases such X-bracing consists of tie rods or angles. In either case it is universally assumed that only one bracing member acts at a time, taking tensile stresses only.

There is a major objection to this practice for, if the bracing consists of tie rods and there are several braced panels in a row, it can hardly be expected that all turnbuckles, etc., would be tightened so uniformly as to make all tie rods act in unison. This inaccuracy may cause some rods to carry most or all of the stress while others take little or no stress. This type of bracing should, therefore, be avoided.

On the other hand, if the X-bracing consists of angles, the assumption simply is not true. If two members of the same material, stiffness and connections are used in the same panel, it cannot be decreed that only one will act; certainly both will act at the same time, one taking tension and the other compression. Of course, if the bracing were designed that way, members of much greater cross section would result in order not to exceed the allowable or desired slenderness ratio (length divided by radius of gyration).

Wind bracing members are usually long. For example, in the case of the very common bay dimension of 20 ft. c. to c. of columns and 18 ft. to the eave line, each X-member would be about 26 ft. (or 312 in.) long, and it would require, for the maximum allowed slenderness ($l/r = 200$), a radius of gyration of 1.57, which is the least r of the largest hot-rolled angle. The allowable compression stress would be only 5,590 lb. plus 30 percent increase for wind stresses, or 7,250 lb.

Good practice calls for the placing of bracing angles with their backs close to the inner flanges of the girt (or lower flanges of purlins), and with connections made at every intersection (see sketch of the accompanying illustration). The length of the compression member can then be measured on a skew from connecting point to connecting point. In the case of the above-mentioned panel dimensions, the unsupported length would then be only 78 in. Each angle would have a stress of $5{,}250 \times \frac{26}{20} = 6{,}800$ lb. either in tension or compression. A $2\frac{1}{2} \times 2\frac{1}{2} \times 3/16$ in. angle has a minimum r of 0.49, in., making $l/r = 159$. The cross section area is 0.90 sq. in. and the fiber stress is 7,550 lb. per sq. in., while the allowable is 7,490 lb. per sq. in. (allowable increase of 30 percent for wind stress needs not be taken advantage of here).



Connecting bracing angles to each girt or purlin as in (a) reduces the unsupported length of the member and therefore its slenderness ratio and size. Single bracing, as in (b) and (c), reduces shop and field work, and results in greater metal efficiency, also making the structure more rigid.

If the conventional method be followed, assigning tension only to one member at a time, the stress would be 13,600 lb., and the net section required, considering increase in stress allowed for wind, would be $\frac{13{,}600}{27{,}500} = 0.495$ sq. in. for which the above selected angles are still adequate. Off hand, it would appear that there is no difference. This is often true in the case of wall bracing as far as weight is concerned. However, the former outlined method is in accordance with the action of the material; the latter is not. The first method also reduces the shear on the anchor bolts.

If, instead of X-bracing, one-angle bracing is used (see sketch b), it would in the above example be stressed to 13,600 lb. tension or compression, and an angle $3 \times 3 \times \frac{5}{16}$ in. is adequate. The weight is practically the same as for the two $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{3}{16}$ in. angles used above, but in the case of one-line bracing there is less shop work; also there is less obstruction to the window area in the braced bays.

Athough the above example does not show any saving of material this is not always the case, especially when the more accurate method is applied to the bracing system in the plane of the roof.

In roof bracing the writer has often obtained 15 to 35 percent saving in material by using one direction diagonals designed to resist tension as well as compression (see sketch c). The method of bracing as proposed here, if carried through the walls and roof, also creates a better-knit, more

rigid structure than in the case of the customary single-acting X-bracing. Loosely stitched members do little to prevent the vibration that usually occurs in hollow structures such as spacious industrial buildings.

There is another advantage in placing an efficient roof bracing high up under the purlins in contrast to bracing at the bottom chord level: sooner or later the latter will be removed because of interference with some new installation. Very often in such cases it is the master mechanic's idea that the structure is in the habit of standing up and will continue to do so without the bracing. Generally it does, though with some squeaking.

Seabees Use Novel Method to Construct Submerged Pipeline

Bulldozers, self-propelled pontoon barges, and empty gasoline drums were used recently by Navy Seabees at an advanced base in placing a 1,900-ft., 8-in. dia., welded steel submerged pipeline.

The first step in the operation was the welding of random lengths of pipe into 200-ft. strings. An area 20 ft. wide by 2,400 ft. long, leading to the launching point, was then rough graded to provide room for the final shore assembly. Empty gasoline drums were set to line and grade in the sand at 12-ft. intervals (Fig. 2) along the center line of this area to provide support for the assembled line and to serve as skids to reduce the tractive power required to pull the pipe to the sea.

After the 200-ft. lengths of pipe had been tested, short lengths of split pipe were welded over each butt-welded joint for reinforcement. The pipe was then placed over the partly buried drums and welded into one continuous 2,200-ft. length. A 3-in. dia. eye of ½-in. reinforcing rod (Fig. 1) was welded to every second joint (at intervals of about 40 ft.) to permit the attachment of drum floats. Each of the latter consisted of an empty gasoline drum secured around the middle with salvaged 3-in. rope made fast to one of the 3-in. eyes on the pipe. When pulled into the water, the pipeline hung suspended from the floats about 2½ ft. below the surface.

Two 90 hp. tractors sufficed to skid the 2,200 ft. of pipe endwise into the water. The tractors were placed about 300 ft. from the shore line and, with successive pulls of about 200 ft., the pipe was moved forward. At the same time, Seabees on the beach secured the flotation drums to the eyes. Two pontoon barges with outboard propulsion units maintained a steady and direct pull to keep the floating line straight and properly directed.

Fig. 1. A split section of pipe is added over butt-welded joint to reinforce the line. Eyeloop is for connection of flotation drum.

Only the seaward two-thirds of the line was provided with floats; the remainder followed along in proper position and served to stabilize the floating portion. With the pipeline in correct position, a flexible hose was flanged to the outboard end of the pipe and buoyed to permit unloading of oil tankers. The supporting lines from the floats were then cut one by one, starting from the shoreward end. Finally, concrete anchors were placed in pairs every 50-ft. along the line, being guided into position by Seabee divers.

This method of placing a submerged pipeline has the disadvantage of requiring the entire length of pipe to be pulled along the launching way in one piece, but it has the compensating advantage of reducing working time in the water. This is important in areas where storms are frequent.

Fig. 2. Empty gasoline drums were set to line and grade in the sand at 12-ft. intervals to serve as skids, over which the pipeline was pulled to the sea. Right: Flotation drums were attached to the line at 40-ft. intervals by a 3-in. rope threaded through the eye shown in Fig. 1.

Notes on Industrial Waste Treatment

• The spotlight of attention at the fifth annual meeting of the Federation of Sewage Works Association, held at Pittsburgh, Pa., on October 12-14, was focused on treatment of industrial wastes. Extracts from papers dealing with various types of wastes and their effect on sewage treatment processes are presented below. A news account of the meeting together with the names of the new association officers appeared in ENR, Oct. 19, vol. p. 463.

Iron Pickling Liquors

The presence of an excessive quantity of acid iron wastes seriously affected the results of biological treatment of sewage at Worcester, Mass., the change to a more modern and efficient method of sewage treatment developing into a troublesome situation under these conditions in spite of experience with a similar treatment plant showing successful operation under normal loads.

The first indication of a change in character of sewage received at the treatment plant came in April, 1943, at which time Imhoff tank sludge showed a pH of 5.6, as compared with a usual pH of 6.8 or 6.9. Until then, no serious operating difficulties from sewage containing acid iron wastes had been experienced during nearly 18 years of operation of the present plant, sewage of this type having been successfully treated for a total period of 53 years.

When the change became apparent, pH tests of hourly samples showed acid sewage throughout the 24 hr., with extreme acidity during the latter half of the night. A spot sampling program in the collection system fixed the source of the large quantity of acid iron waste liquors as three wire mills located on one sewer, and a metal mill discharging to the collector of the same sewer.

Within the next few months considerable difficulty was experienced in drying an abnormally heavy growth on the surface of the trickling filters. The iron content of the raw sewage and filter influent was greater than for some years, there was no spring unloading of suspended solids from the filter, the dissolved oxygen and nitrate nitrogen contents of the trickling filter effluents were much less than usual, and the stability of the filter and final effluents was from 60 to 65 percent. However, while the results of sewage treatment had deteriorated, the physical structure of the sewage treatment works appeared to be without damage.—*Roy S. Lanphear, supervising chemist, sewage treatment plant, Worcester, Mass.*

Fats, Oils and Greases

Discharge of fats, oils and greases from rendering plants, machine shops and petroleum refineries presented serious difficulties in sewage facility operation at Los Angeles, Calif., due to reductions in main capacities, and generation of an explosive sewer atmosphere. The highly concentrated recreational facilities of the adjacent ocean beaches also suffered severely as a result of the pollution and nuisance caused by floating oil and grease slicks carried inshore from the outfall sewers by wind and tide. To correct conditions several types of remedy were tried.

Rendering-plant wastes were handled cheaply and effectively by installing large concrete grease-flotation tanks in the plant lines, the recovered fats being sold—in one case to the concern which had discharged them. Oil and grease washings from garages, auto wash-racks and machine shops were handled effectively by ordinary grease traps, and petroleum refinery wastes were excluded from city mains until required pretreatment had been effected.

The elimination of gasoline and oils from auto-wash wastes and refinery wastes considerably reduced the hazard of explosive sewer atmosphere. Where the materials causing explosive mixtures could not be economically eliminated, the sewers were ventilated by blowers exhausting through tall stacks. In some cases ventilation ducts were run up the sides of buildings from manholes, to exhaust through wind-driven turbine ventilators above the building parapets. Sewers as small as 8 inches in diameter were ventilated by this latter means, although close spacing of the ventilators was found necessary on the smaller sizes.—*Reuben F. Brown, supt. of sewer maintenance, City of Los Angeles, Calif.*

Packinghouse Wastes

Treatment of packinghouse waste is a task of great magnitude. In 1943, for example, the wastes produced from 98 million animals slaughtered in this country under federal supervision totaled 50 billion gal., equivalent, on a biochemical oxygen demand basis, to a population of 3.6 billion people. Wastes emanating from a packing establishment are characterized by (1) large quantity; (2) considerable seasonal variation in quantity; (3) highly varying rates of flow; (4) wide variations in strength, particularly as regards B.O.D., suspended solids, grease and organic nitrogen; (5) high temperature; (6) speed at which some of the organic solids go into solution; and (7) strong and disagreeable odor. Other factors affecting decisions covering treatment methods involved a knowledge of how much pre-treatment is given by the packer, and the degree of final treatment necessary, to protect the receiving waterway.

Two treatment methods

Two specific cases of packinghouse waste treatment, both considered successful, are those at Sioux Falls, S. D., and Austin, Minn.

At the former city, where the domestic sewage and packinghouse wastes may be treated separately or together, pre-treatment comprises plain sedimentation and grease skimming at the packinghouse, the sludge being pumped directly to the sludge

digestion tanks at the city treatment plant. The pre-treatment removes about 34 percent of the B.O.D. and 58 percent of the suspended solids. If the waste is then treated separately from the domestic sewage, the process from this point onward includes flocculation of the pre-settled wastes with air and waste activated sludge, preliminary sedimentation and filtration, intermediate sedimentation and secondary filtration.

During the winter months the packinghouse load is greater and it is necessary to secure the maximum amount of purification from the filters before the sewage goes to the aeration tanks. Another reason for applying only the packinghouse sewage (with recirculation) to the secondary filters in the winter is to keep them warmer and promote greater biological activity.

In this case the effluent from the secondary filter is recirculated through the secondary sedimentation tank and filter for several cycles before finally being routed through the aeration plant, the final settling tanks and then to the river.

Flocculating the packinghouse waste with air and waste activated sludge has increased the removal of B.O.D., suspended solids and grease by the preliminary sedimentation tanks and has been especially helpful in throwing out the grease in the form of sludge rather than scum.

The preliminary filters, 87 ft. in diam., and 5½ ft. deep, use crushed granite aggregate ranging in size from 2 to 3½ in. The filters are backwashed at about 2-week intervals with final effluent.

Continual dosing improves process

The second-stage filters, since being equipped with rotary distributors and operated with recirculation, have done an astonishing job of purification. Prior to the installation of the preliminary filters and their rotary distributors, and also prior to the procedure of recirculating continuously through the secondary filters, these latter were subject to clogging and low efficiencies, especially in the colder months. Continuous dosing has kept the filters warmer during cold weather and has maintained an active bacterial flora throughout the entire depth of the units. Dead *psychoda* flies appeared in the effluent all last winter and the nitrate content of the effluent ranged from 3 to 10 ppm.

Some difficulty is experienced, particularly in warm weather, with denitrification of the activated sludge in the final settling tank, causing large amounts of sludge to rise in the tanks and go out with the effluent.

Austin sewage treatment plant

The combined packinghouse waste and domestic sewage at Austin has quite different characteristics from those of the combined wastes at Sioux Falls, due to the different pretreatment given the waste at Austin. At Sioux Falls 60 percent of the total organic load of the domestic sewage and packinghouse waste is removed by preliminary sedimentation. At Austin, only about 15 percent of the total organic load is removed by flocculation and sedimentation in spite of exceedingly heavy doses of coagulant.

The preliminary filters have consistently removed from 30 to 40 percent of the applied B.O.D. loadings ranging from 15,000 to 11,000 lb. per acre-ft. per day. The final filters, which have fixed-nozzle distribution systems, and which are also housed, have not performed as well as the second-stage filters at Sioux Falls.

Sludge disposal not solved

At neither plant has the problem of ultimate disposal of sludge been solved. At Sioux Falls, where the total daily dry solids load amounts to about 54,000 lb., all sludge is digested. Sludge gas is collected and utilized to generate power, to operate the blowers, and for heating purposes. Digested sludge and all supernatant liquor is lagooned and dried.

At Austin, where the solids load is about 10,000 lb. daily, about 75 percent of the sludge is digested in heated tanks, the remaining 25 percent being digested in an open lagoon to which digested sludge is also discharged.

No routine procedure has been developed for removal of sludge from the lagoons at either plant.—*Kenneth V. Hill, partner, Greeley and Hansen, consulting engineers, Chicago, Ill.*

Pulp, Paper and Paperboard

FEW sewage treatment plants in this country are required to treat wastes discharged from plants manufacturing pulp, paper and paperboard products. The types of waste received by these plants consist of white water and bleach liquors, as the high strength of pulping liquors have excluded them from sewage systems. However, as the mills follow the present trend toward partial treatment of the weaker wastes more sewage works will probably be called upon to handle these wastes.

This is particularly true of the discharge from small paperboard mills using waste papers as raw material. Most such establishments are able to treat their white water to a degree where its strength is comparable to that of domestic sewage and the treated effluent will respond to the usual sewage treatment processes. High degrees of treatment cannot be achieved economically by the small mill, hence the municipality already operating a treatment plant is the logical recipient for such wastes if they respond to the sewage treatment process employed and capacity is available to handle the 2,000 to 5,000 gal. per ton of finished product discharged from board mills returning 75 percent of the treated water for reuse.

The suspended solids in partially treated board mill wastes consist generally of short fibers, clay, ink, and debris; the dissolved solids consist of adhesives, wood residues, water impurities and extraneous organic matter. When these wastes are mixed with domestic sewage by passage through sewers and settling tanks the short fibers tend to coagulate in the form of light floc which will settle in adequately designed tanks. Removals in the range of from 30 to 50 percent can be expected and if flocculation precedes settling greater removals are probable. A considerable volume of mill waste in relation to the total flow can be handled without perceptible loss in settling efficiency, but cooperation of the mill is necessary in seeing that a minimum of pulp washed from the machines during cleanup periods reaches the drains.

The suspended matter responds well to coagulants employed in sewage treatment. A dense floc is formed which settles more rapidly than sewage flocculated with chemicals, alum appearing to be very adaptable for the purpose. The chemical dosage required has been found to range from 200 to 1,000 lb. per million gal., or about the same dosage range as that

required for domestic sewage of average strength.

Laboratory experiments have demonstrated that the B.O.D. of these mill wastes can be reduced to the same degree as domestic sewage by the activated sludge process and there is no reason to believe that mixtures of the waste and sewage cannot be satisfactorily treated by this process in combination with trickling filters. The effluents generally contain bacteria in quantities similar to those found in sewage so that efficient disinfection of sewage-waste mixtures can be obtained with the normal chlorine dosages for strong domestic sewage (10 to 20 ppm.).—*Harry W. Gehm, technical advisor, National Council for Stream Improvement, Inc., New York, N. Y.*

Connecticut's Problems

Industrial wastes of a polluting nature are discharged into the waterways of Connecticut at the rate of about 100 mgd. They vary enormously in character and it is estimated that their total pollution load upon the waterways is equivalent to that which would result from the sewage discharged untreated by all the municipalities of the state.

These wastes are produced by many different types of industries. The three largest groups are: (1) metallurgical — brass and copper, iron and steel; (2) textile; (3) paperboard and allied products. The smaller groups are hat, leather, chemical, rubber, distillery, dairy, laundry, machine tools and others.

Large quantities involved

The amount of materials discharged in these wastes is in some instances startling. In 1941 a survey was made of the brass and copper heavy industries in the state to determine the amount of metals lost primarily in the pickling processes. During that year it was estimated that 1,560 tons of copper and 1,150 tons of zinc were discharged in the liquid wastes. This amounted to 2,675 lb. of copper and 1,950 lb. of zinc per 500 tons of processed material shipped. The pickling operations required the use of 10,250 tons of sulphuric acid, 1,440 tons of sodium bichromate and water at the rate of about 8 mgd.

Paperboard and allied industries in Connecticut discharge about 23 tons of pulp per day with 18 million gallons of water, one plant alone losing over 5 tons of pulp per day in this manner.

Waste pre-treatment necessary

The desire of some industrial officials to discharge wastes into municipal sewerage systems is natural and logical. However, without satisfactory pre-treatment the majority of industrial wastes cannot be accepted in plants using biological treatment processes. Examples of this are found in the inhibitory effect of copper or chromium on digestion when constant concentrations of more than 1 ppm. are present. Other toxic materials in plating solutions such as nickel, cyanides, etc., also have an inhibitory effect upon biological treatment.

A detailed investigation of the wastes from the pickling operations at one of the large brass and copper plants revealed the startling fact that the dilute wash waters carry away 88 percent of the acid used and 90 percent of the lost metals. The remainder is lost in the form of spent pickle liquor.

A great deal of research has been undertaken in an attempt to find a satisfactory method for treating this type of waste and in 1935 a pilot plant was operated at a large brass manufacturing plant where the pickling wastes were mixed with cooling and other used water. The average composition of these combined wastes covering a period of about six months was found to be:

Sulphuric acid	105 ppm.
Copper	24 ppm.
Zinc	20 ppm.
Chromium (total)	20 ppm.
Chromium (as chromate)	9 ppm.

The purpose of this study was to recover the copper and zinc in a form that could be re-used in the furnaces and chromium in the form satisfactory for re-use in pickling.

The results of this investigation indicated that a complete treatment plant to handle 3 mgd. would cost approximately $200,000 to construct. The annual fixed and operating costs were estimated at $79,000 and the value of recovered products at $55,000.

Treatment of wastes from iron and steel pickling operations has for some years been carried out at one plant by neutralization with lime, flocculation and precipitation, on a continuous flow basis. The effluent contains practically no iron, is nearly neutral and water clear. Sludge is disposed of in lagoons. Another plant has manufactured copperas from concentrated wastes for more than 20 years, with some of the more dilute wastes discharged to the sewerage system.

Paperboard mill wastes

The volume of paperboard mill wastes in the different plants varies from 5,000 to 40,000 gal. per ton of product. They usually have a pH of from 5.0 to 7.0 and contain from 2 to 6 lb. per 1,000 gal. of suspended solids with occasional surges of several times the high figure. The 5-day B.O.D. usually varies from 100 to 600 ppm.

Save-alls of various types are used primarily for reducing the fiber loss in the plant. However, from a pollution standpoint the revolving screen type in general use cannot ordinarily be expected to produce an effluent with a suspended solids content of much less than 2 lb. per 1,000 gal.

More effective treatment can be obtained either by sedimentation or flotation and the solids removed can generally be re-used, fiber recovery being sometimes as high as 95 percent. Temperature is a factor affecting the sedimentation of these solids, not only in the difference between that of the wastes and the atmosphere but also between the wastes themselves.

Textile wastes

The liquid wastes produced in dyeing and finishing operations on cotton, wool, rayon, silk and felt materials vary greatly in composition and volume, and do not lend themselves to the recovery of by-products. The exception to this is the recovery of caustic soda from mercerizing liquors by dialysis or by centrifuging and evaporation.

Chemical precipitation is the most widely used method of treatment which, naturally, has its limitations as far as the quality of effluent produced is concerned. The chemicals found to be most effective are lime and iron salts—either ferrous sulphate (copperas) or ferric sulphate. Combinations of lime and alum, ferric chloride, calcium chloride and soda ash are effective on certain

wastes. Sulphuric acid is necessary at times for pH control, neutralization of strongly alkaline wastes, precipitation of certain dyes and to break up soap solutions.

The B.O.D. of composite wastes usually varies between 200 and 1,500 ppm. With the addition of proper amounts of chemicals and adequate mixing or flocculation preceding a sedimentation period of about 2 hr., 80 percent to 90 percent of the oxygen consuming material can be removed when the B.O.D. is over 800 ppm. and 60 percent removal can be obtained when the B.O.D. is from 200 to 300 ppm. The amount of chemicals necessary is usually 1 to 2 lb. per 1,000 gal. for the weaker wastes.

The cost of chemical treatment is of course dependent upon many factors. However, for plants discharging less than 500,000 gpd. the fixed and operating costs may run from 10 to 20 cents per 1,000 gal. For plants treating over 1 mgd. the costs may be less than 10 cents per 1,000 gal.

Wastes from a textile plant discharging dyeing and finishing wastes through an equalization and controlled flow system are satisfactorily handled at a sewage treatment plant where the sewage is chlorinated during the bathing season, the wastes apparently having no serious effect upon sludge digestion.

At another plant it was found that textile wastes would probably not interfere with the operation of the sewage treatment plant if their discharge were controlled through an equalization system so that the volume at any time would not exceed 10 percent of the volume of sewage.

Cutting oils reclaimed

Water soluble oils used for coolants in cutting and grinding operations on metals have caused increased pollution during the war. However, two methods have been developed for treating these compounds for re-use by removal of the small metal particles: (1) Sedimentation and filtration through a spring filter, and (2) flotation of the metal particles by a process used in ore dressing. Three plants in Connecticut doing precision work have been using this equipment for a number of months and re-using, at a substantial saving, all of the treated coolant. The control of bacterial growths in a closed system is a problem requiring further study.

Spills and drippings, not re-usable, can be treated by combinations of sulphuric acid, alum, ferric sulphate and lime to produce a satisfactory effluent.

Plating wastes

Plating wastes contain chromium, copper, nickel, cadmium, other metals and cyanides, all of which are toxic.

At one plant the composite wastes usually have a pH of from 2.0 to 5.0 and contain from 100 to 500 ppm. of chromium in a form that cannot be precipitated without the use of a reducing reagent. The most satisfactory reagent for these wastes was found to be barium sulphide. Copperas is satisfactory for some types of wastes.

The treatment consists of batch operation with preliminary tests for proper amounts of chemicals. Barium sulphide is added in solution form in required amounts (10 lb. per 1,000 gal. for 400 ppm. of chromium); copperas at 0 to 3 lb. per 1,000 gal. and lime from 3 to 5 lb. per 1,000 gal.

Occasionally, sulphuric acid is added to the influent for proper pH control and liberation of the cyanide gas. The effluent is usually water clear, having a pH of about 8.5 with all metals removed and the cyanide content reduced about 60 percent. Sulphide odor, if objectionable, can be corrected by the addition of small amounts of sodium or potassium permanganate.—*William S. Wise, chief engineer, Conn. State Water Comm., Hartford, Conn.*

Citrus Canning Wastes

While the citrus fruit canning season in Florida lasts only six months of the year, the disposal of the wastes produced is a year-round matter involving two distinct problems—handling washwaters and press liquors. The latter have a low solid content, but are high in dissolved sugars and organic acids.

Treatment of the canning wastes in trickling filters was proved uneconomical by a test installation, the common methods of disposal being discharge into rivers and lakes, broad irrigation and lagooning. The last two methods are not applicable in some sections due to high groundwater levels, and the use of lagooning is further restricted by the slime and odors developed. Two plants at Lakeland discharge into the city's sewer system. In general the pH of these wastes is 5.5, and a 12-hr. retention reduces the B.O.D. by 50 percent.

In one case, citrus wastes are discharged into two drainage wells at the rate of 10,000 gpd. with a domestic sewage solids equivalent of 300,000 to 400,000 population. Digestion of these wastes in abandoned water well bores results in the production of a burnable gas with pressures sufficient to make feasible its domestic use from other wells tapping the same underground pocket. Study of this installation suggested the production of alcohol from the citrus "molasses", but the process did not prove satisfactory.—*Robert S. Ingols, formerly research fellow, Florida Citrus Commission, U. S. Dept. of Agriculture, Winter Haven, Fla.*

Rubber Industry Wastes

The main problems posed to the sewage plant operator by rubber industry wastes originate from the reclaim industry and synthetic rubber plants. Since 1930 the recovery plants of Akron's reclaim industry have consisted of settlement tanks of both the fill-and-draw and continuous-flow types, the serious overloading of the last few years producing poor treatment results.

The synthetic rubber pre-treatment installations in the Akron area use, for the most part, settling tanks much like Imhoff tanks. Formerly the municipal plant problem was one of handling large lumps of solids resulting from dumping of bad batches, but of late is one of heavy viscous oils and synthetic rubber "crumbles" appearing in the final effluent. These crumbles are particles up to about one-quarter inch in diameter and having a specific gravity very close to 1.0. Thus, they do not settle out nor float for removal by skimmers, but pass through both the pre-treatment tank and the municipal plant unchanged.

The increase in solids and low pH are bad factors in plant operation, but sludge digestion is not apparently adversely affected, although the rubber in the plant influent is not digested.—*T. C. Schaetzle, engineer-chemist, sewage treatment plant, Akron, Ohio.*

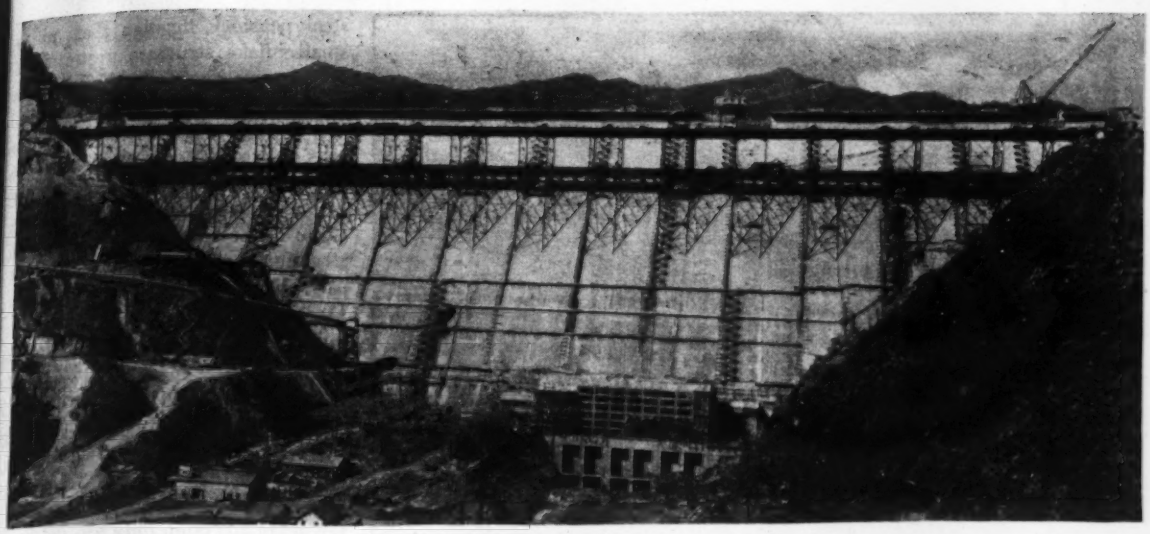


Fig. 1. Filling the reservoir started Nov. 7 at TVA's largest concrete structure, the 2,800,000-cu.yd. Fontana Dam.

Design Facilitates Rapid Construction of TVA's Fontana Dam

***Contents in Brief**—Fontana Dam of the Tennessee Valley Authority was designed with speed of construction as the paramount factor but with scarcity of materials and shortage of skilled labor important considerations. The dam proper is of conventional gravity section with exceptionally few irregularities. The powerhouse is almost entirely separate from the structure though located at the down-stream toe. Diversion works and permanent spillways are through rock abutments rather than the dam. The spillways utilize a very simple deflector scheme, throwing the falling water upward to assist in dissipating the energy from the more than 400-ft. fall.*

FONTANA the world's fourth highest dam, as well as the fourth largest in concrete volume is approaching completion in 20 months from the start of concrete placing. This is believed to be the fastest construction schedule ever attained for such a structure, met partly by coordination of the design with the construction planning to reduce the effect of expected handicaps of inadequate labor and shortages of essential materials and equipment.

Hence, the dam is a gravity structure with a main mass section almost entirely free from any irregularities. Diversion channels and spillways to pass flood flow, are kept out of the main construction area by use of tunnels through the abutments rather than special sections in the dam itself. With the spillway cared for elsewhere it has been possible to utilize the full width of the narrow gorge of the river for a powerhouse at the foot of the dam. To avoid interference with the mass concreting, the powerhouse is entirely separate and can follow dam construction as available labor permits. Both design and construction of the 2,800,000-cu. yd. dam have been done by forces of the Tennessee Valley Authority.

The Fontana site on the Little Tennessee River has long been considered to be one of the best for power development in the Tennessee valley as 1,600,000 acre-ft. of usable storage is available below a watershed with dependably high rainfall. The site is high in the mountains of Western North Carolina yet gets some water from the Glenville and Nantahala reservoirs of the Aluminum Company of America. Fontana in turn passes water to the Cheoah and Calderwood plants of the Aluminum Co., and the water is further used through all of the Tennessee River dams except Fort Loudoun. Thus, water from El. 1710, the full Fontana Reservoir, is utilized for power through a total head of about 1,275 ft. in falling to El. 310 at the confluence with the Ohio River.

Geologically the Fontana site is low in rank among metamorphic rocks of sedimentary origin, being almost entirely quartzite and slate. The slate and quartzite are interstratified with all strata structurally deformed and the originally horizontal strata now steeply tilted. There are numerous small faults at the dam site but none of consequence in the river-bed or the abutments. The most serious geologic problem at Fontana was presented by the overburden on the abutments. This was as much as 100 ft. deep, below which weathered rock required further excavation to dependable foundation material.

For construction purposes the mass dam was divided into 35 regular

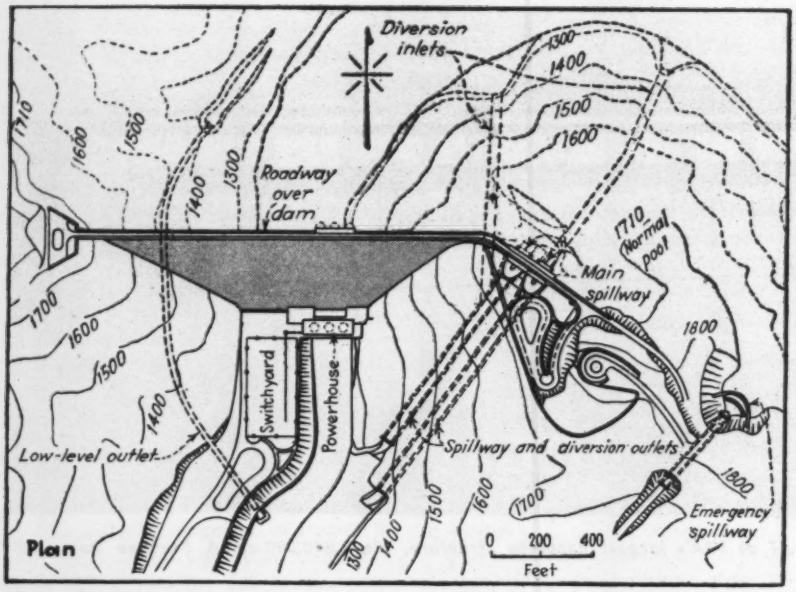


Fig. 2. Both temporary stream diversion and permanent spillways for Fontana Dam are accommodated outside the mass concrete area to simplify and speed the mass dam construction.

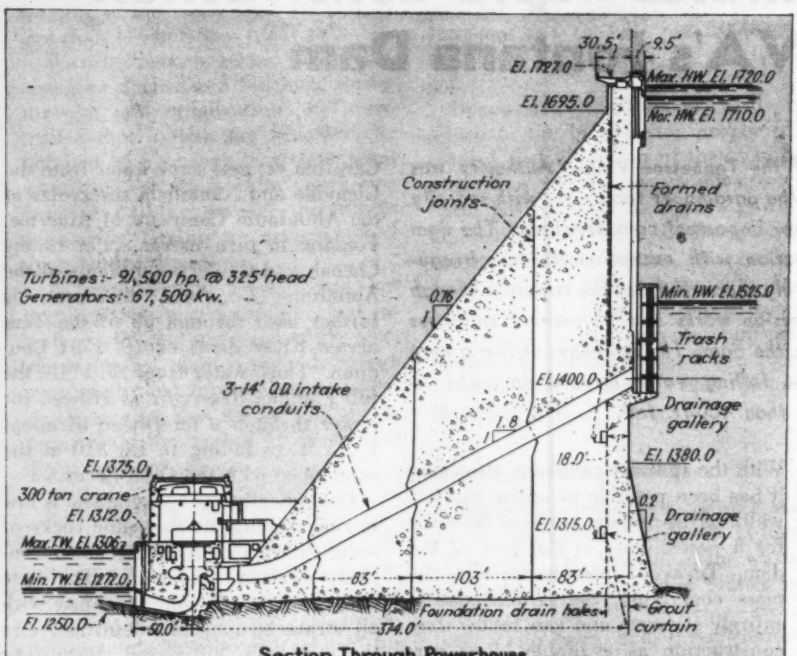


Fig. 3. Fontana Dam rises more than 470 ft. above the streambed. The downstream face has a constant slope and the upstream side has projections in only three central blocks where intakes for the powerhouse are located.

blocks each 50 ft. wide with very few irregular shaped monoliths at one abutment. In the river channel the blocks have a height of more than 470 ft. and a length, parallel to the stream, of nearly 400 ft. Up and down stream the blocks are divided into as many as four sections by deeply keyed vertical construction joints that are grouted, after all expected shrinkage has taken place, to make each 50-ft. wide block a monolith. Three of the 35 principal monoliths near the center of the dam each have a 14-ft. dia. steel penstock through them with a small intake structure upstream, the only projections from the mass concrete.

The spillway for Fontana Dam consists of two 34-ft. dia. tunnels through the east abutment, the same openings being utilized for diversion of the Little Tennessee River during the construction period. The spillway tunnels each have two openings upstream. First constructed was a temporary, low-level inlet for use as the stream diverson channel. The opening for the permanent spillway was driven upward on a 1:1 slope from a mid-point in the tunnel and the permanent passages lined with concrete to a diameter of 34 ft. The section used for low level diversion only was not lined and was closed by a concrete plug, placed behind temporary bulkheads, when reservoir filling started.

For permanent operation the spillways are regulated by tainter gates with their top at the upper pool level. Lower sluices, discharging into the same tunnels, can be used to regulate the flow. Location of the spillway tunnels in the abutment, with the discharge well downstream from the dam site, has made it possible to do all of the construction work in a single stage without providing for water to flow through or over the dam.

Provision for flood flow

A tunnel was constructed through the west abutment for railroad access to the project, connecting to an existing rail line just above original river level. After construction was complete an 84-in. regulating valve was installed for the purpose of permitting some flow to pass the dam while the reservoir is filled to the level of the powerhouse intakes. This low level tunnel will be available for permanent use and has sufficient capacity to drain the reservoir at low flow seasons.

The discharge capacity provided by the spillways and the low passage will take more than double the estimated previous flow of the river. However, an additional high level emergency bypass has been built for the one super flood that may occur once in 500 years. The bypass is simply an overflow arch dam upstream from a tunnel near the top of the reservoir, which has an uncontrolled fixed crest 5 ft. above the maximum desirable lake level. The tunnel discharges into a natural water course down the side

of the mountain, well below the dam. The powerhouse has provision for three 91,500-hp., 67,500-kw. units. Two of these units are being installed now, the third being deferred for the present by the War Production Board. Each turbine uses 2,900 cfs. at full gate. The average flow of the river is 3,640 cfs.

All welded scroll case

An innovation in powerhouse design practice in the U. S. is welding the scroll case, previous practice having been assembly by riveting. The steel plates, up to 1⅞ in. thick, are attached by 12 to 14 passes of manually held ⅞-in. or ¼-in. rods, with each pass cleaned carefully before the next bead is added. Each pass of the weld is peened, while hot, with pneumatic chipping hammers to relieve stresses in the welds.

The scroll case was designed to be welded in the fabricator's shop in sections as large as could be moved by rail, leaving six joints to be welded at the dam. All welding was detailed to be done "downhand" by welding from the outside for the top half of the circle and inside for the lower half. The welding "V" was made about 1¼ in. wide and arranged with extensometer points across the V so that movement and stress could be continually checked. Wedges were driven into the V and the speed ring was heated at the start of welding to spread the joint as much as ⅜ in. Shrinkage of the metal, as welding proceeded, pulled the metal back to its normal position, the extensometer points across the V being constantly checked to assure that locked-up stresses did not remain to cause disastrous strains.

After welding was completed from the top side, the "backing-strip" was taken off the lower side of the joint, the joint cleaned to good metal and back-welded. A test head was welded on the scroll case and a hydrostatic head of 371 psi., about twice the maximum operating pressure, applied as a test. The test head was then burned off and a riveted connection made to the 14-ft. dia. penstock.

The only similar scroll-case construction is that completed recently on the Saguenay River development in the northern Quebec. Both installations were made by Allis-Chalmers Mfg. Co., which also supplied the turbine units.

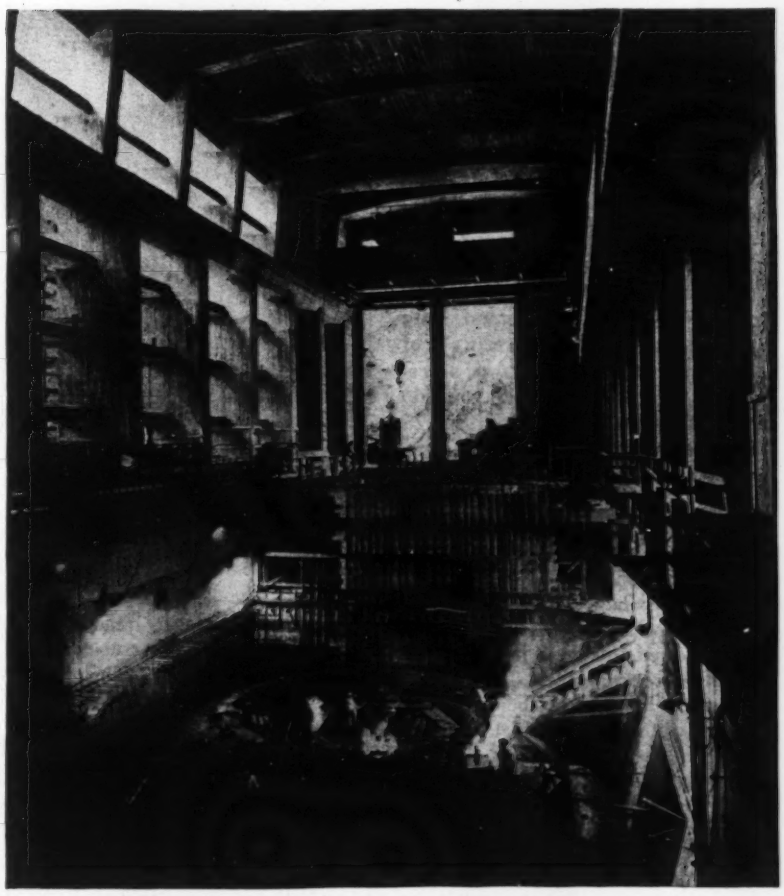


Fig. 4. All-welded scroll cases were used, being the first in this country. The concrete powerhouse is characterized by massive rigid frames.

At an earlier time, when the Aluminum Co. contemplated construction at the Fontana site, the plan was to build the powerhouse about a mile downstream from the narrow gorge where the dam would necessarily be placed, thus taking advantage of a 5-ft. drop in the river from the powerhouse to the pool formed by Cheoah Dam. This plan was abandoned when steel for the pipe and for a surge tank could not be obtained, but the added head is to be attained, nevertheless, by excavating the tailrace.

The powerhouse is of concrete construction and of necessarily massive sections to carry the heavy crane loads and provide the stability necessary for machinery operation. For architectural appearance, the interior concrete surface was formed with 1x4-in. boards all carefully aligned to give a regular board mark effect. No bolts were permitted through the exposed concrete in order to avoid patched holes that mar the appearance. Exterior of the building is faced with limestone, as are many other powerhouses in the Tennessee valley.

Mass and face concrete

Concrete for Fontana Dam is made from quartzite aggregates quarried and crushed near the dam with fine materials prepared from the same source. Cement used is TVA designation Type B (equivalent to A.S.T.M. Type II) designed for good strength with only moderate heat. Low-heat cement (A.S.T.M. Type IV) would not provide sufficient strength to hold form ties on lifts added rapidly in cold weather and it was not certain that a sufficient quantity of the Type IV product could be made available. Coarse aggregates are provided in four sizes: a maximum of ¾ in., 1½ in., 3 in. and 6 in.

Mass concrete was made with 0.8 bbl. of cement per cu. yd. of concrete, using the 6-in. size aggregate. A slump of about 1 in. was specified and used

at first with a water-cement ratio of 0.75 by weight. Shortage of labor and the need of easing the problem of placing and vibrating the concrete into position made it necessary to increase the cement content to 0.85 bbl. per cu. yd. with a slump of 2.3 in. The mass concrete is designed to have a strength of 4,000 psi. after one year, and actually averages about 4,300 psi.

The mass concrete, with the low cement content, will withstand only about thirty cycles of freezing and thawing, so a richer mix was necessary for the 5 to 8 ft. near the outside faces of the dam. Here a mix with 1.25 bbl. of cement per cu. yd. has been used, which readily withstands, after 45 days curing, 150 or more cycles of freezing.

Full scale tests on mass concrete containing 0.85 bbl. of cement per cu. yd., after being subjected to the vacuum process for removal of free water, showed no sign of deterioration after 200 freezing cycles. The vacuum process was not used on the dam, however, as cloth could not be obtained for the necessary forms and the construction forces felt it would require added workmen, not then available.

Artificial cooling required

Never before has mass concrete risen as fast nor has so much been placed in a small area as at Fontana Dam. Concrete at Grand Coulee Dam was placed in larger quantities but over a larger area, so it was not necessary to concentrate the work. At Fontana, however, concrete even in shallow lifts, did not have an opportunity to cool. In general, the next lift of concrete had to be placed over a block by the time it had reached its maximum temperature without permitting time for the heat from hydration of cement to dissipate. It is estimated that it would require at least 40 years for the center of the dam to cool by natural means.

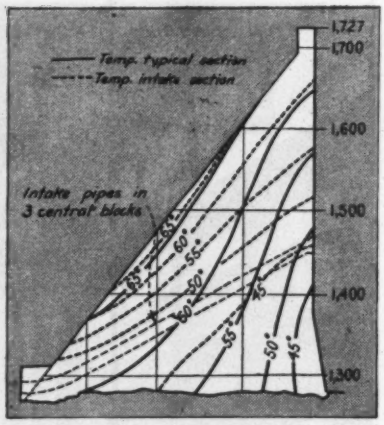


Fig. 5. Concrete was cooled to the temperatures shown before the joints were grouted. Because water in the penstocks will be cold, the blocks through which they pass were cooled to lower temperatures.

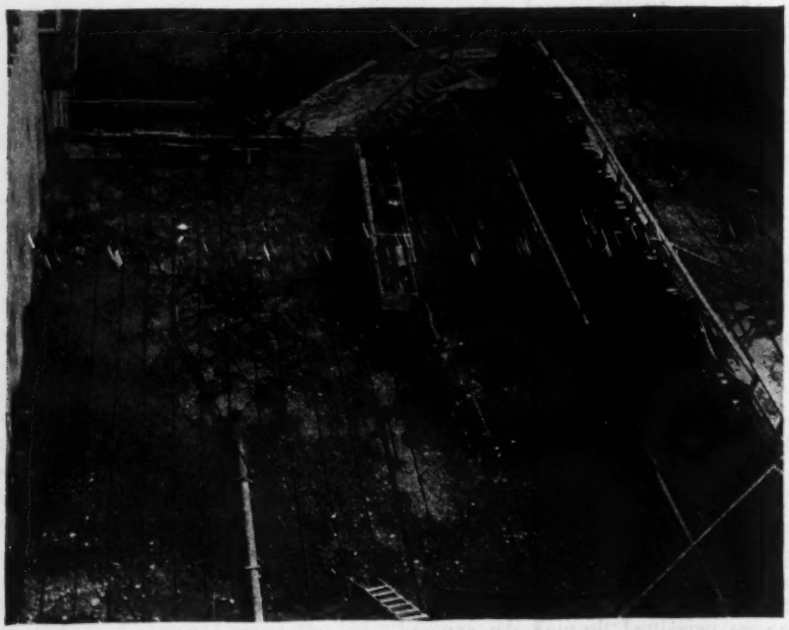


Fig. 6. Cooling pipe are laid at 6 ft. 3 in. centers on top of each 5-ft. lift of concrete. Pipe is tied down to wires embedded in concrete.

The required cooling and shrinkage at Fontana has been attained in two to six months by circulating cool water through pipes embedded in the dam. Water is used from the river and cooling is supplemented by a 250-ton per day refrigeration plant set up near the dam. By limiting the temperature rise and removing as much heat as possible within a few days after the concrete is placed, while the concrete has some degree of plasticity, cracking of the dam has been kept to a negligible amount.

The concrete, placed generally in 5-ft. vertical lifts, is cooled by circulation through 1-in. O.D., 17-gage pipe laid on top of each lift at 6-ft. 3-in. spacing. Concrete placed in the summer, at a temperature of about 75 deg., was held to a heat rise of about 30 deg. by circulating 4.5 gpm. of river water at a temperature of 75 to 80 deg. through the pipes. Water at a much lower temperature was preferred but refrigeration capacity was available only for cooling in the critical areas and to the final low temperatures shown in Fig. 5. About double the installed capacity of refrigeration equipment was desirable but the machines could not be obtained.

In the critical areas of the dam, just above the rock, the lifts were limited to 2½ ft. and cooling coils, during hot weather, were spaced at 2½-ft. centers. Here, refrigerated water kept the concrete to a 20-deg. temperature rise.

Before the load from the reservoir comes on the dam it is necessary that the vertical longitudinal joints be grouted, and before grouting is done it is essential that the blocks take their full shrinkage, hence the rush for cooling. To attain the final low temperature required, refrigerated water is cooled to about 40 deg. and routed through about 130 coils, each averaging 800 ft. in length. The temperature of the water returning to the plant is about 50 deg. Piping is arranged so that flow of the water can be reversed, primarily to equalize the cooling along the pipe path, but reversal of flow assists in flushing sediment out of the pipes.

Foundation solidification

The foundation rock at Fontana Dam has some defects but no serious difficulty has been encountered in construction. Partial grouting of the foundations was undertaken prior to

facing of the concrete but, due to surface leakage through joints, cracks, and steep dipping beds the scheme of early grouting was found unsatisfactory. Plan for the first stage of grouting was to use 20-ft. deep holes on 10-ft. centers, made with a wagon-drill. These were washed out and grouted at 20 psi. In many places it was impossible to build up any pressure with the grout. As a second stage of grouting holes 40-ft. deep were drilled between the first holes with the expectation of grouting at 60 psi. but frequently this could not be attained. Some holes were drilled and piped to the galleries or drilled through the concrete from the gallery elevation, grouting being done after the surface had been covered.

The final foundation and lower dam grouting program at Fontana contemplates drilling through the concrete below the gallery and into the rock as required. The cut-off curtain consists of a single line of wagon-drill holes 3½ to 5 ft. apart and 40 ft. deep, and diamond-drill holes on 5 to 10-ft. centers, 80 to 150 ft. deep. The diamond drill holes were grouted at 300 psi. at the river bed level, reducing to 100 psi. near the top of the abutments.

The drilling program introduced another design innovation—enlargement of the inspection galleries to a size such that core drills and other machines could be readily operated in them. The galleries at Fontana are 6 ft. wide and 10 ft. high.

The rectangular tunnel apparently is subject to less stress and cracking than the more elaborate and costly half-round roofs previously used. Reinforcing is a simple mat of straight rods under and above the tunnel.

Grouting to unify the structure

Fontana Dam is the first structure on which TVA has used grouting of joints between the blocks of concrete to unify the structure. Such grouting has been used on Bureau of Reclamation dams and procedures follow the same general method. Longitudinal joints are grouted from foundation rock to their full height in areas that are limited by grout stops, 20 to 50 ft. high and the 50-ft. width of the block. Transverse joints are grouted from the rock surface up to about 50-60 ft. above the lowest areas. Grout boxes are placed on the forms, before concrete is placed, at 10-ft. centers in rows 5 ft. apart vertically and connected to the outside with ¾-in. tubing. An independent vent is provided at the top of each grout area under a 4x4-in. "V" groove below the top seal. Some difficulties have been encountered in the joint grouting, due largely to leakage into an unrestricted section along joints between the grout areas.

High-early strength cement has been used for all grouting, as the more finely ground material remains in suspension longer and penetrates more readily into fine cracks. The grout usually is prepared with a water-cement ratio of 1.5 for the first batch and then 1.3 until refusal. Several joints have been drilled into, and generally have been found well filled though occasionally no trace of grout was found.

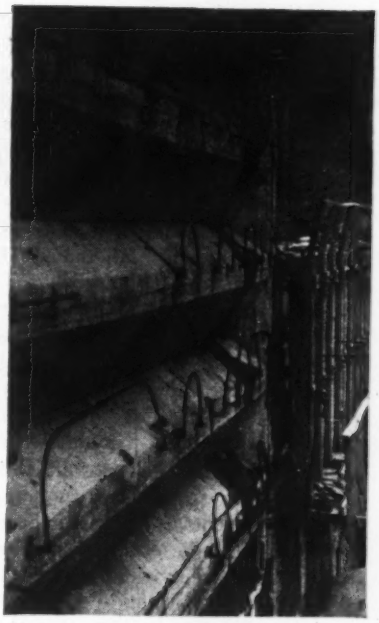


Fig. 7. Deep keys are used on joints parallel to the face of the dam. Pipe loops are on the cooling system.

Unusual spillway design

Each of the two 34-ft. dia. spillways in Fontana Dam will carry about 100,000 cfs. Each tunnel has three

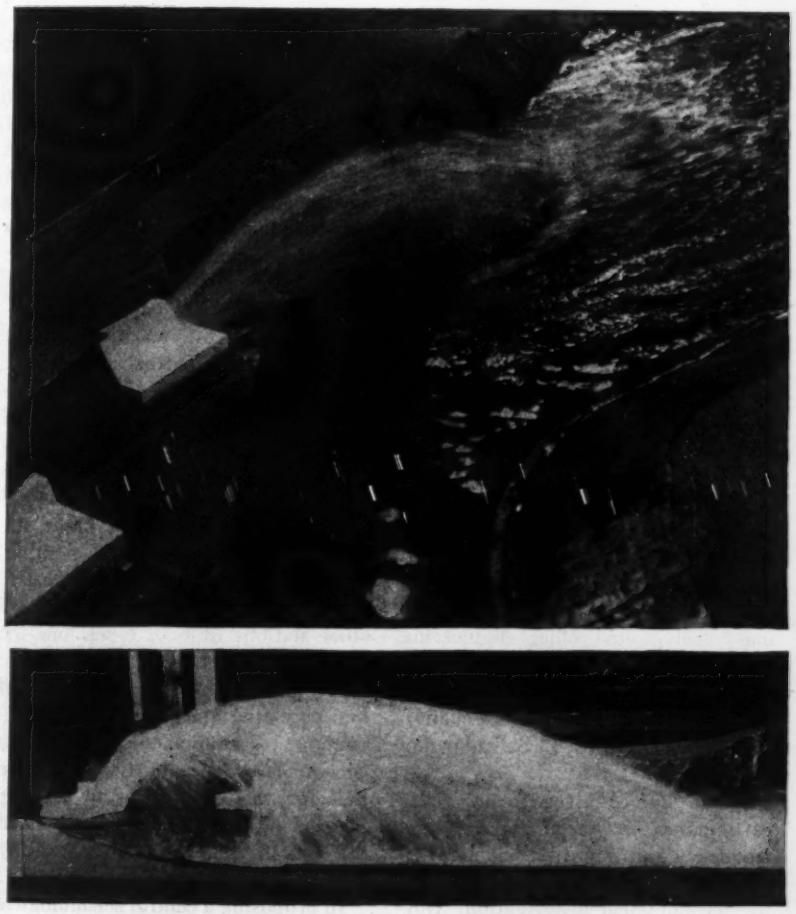


Fig. 8. Laboratory experiments indicate that the newly developed energy dissipator scheme will be highly successful.

outlet sluices at El. 1590, able to pass 11,500 cfs. at full reservoir head, while two 35x35-ft. tainter gates, with their top normally at full pool level, El. 1710, can be opened to admit the full 100,000 cfs. Gates in the three sluices and in the two tainter gates in each spillway inlet are designed to be operated together to provide symmetrical flow in the tunnel. The area at the discharge end of the tunnel is restricted about 20 percent to maintain positive pressure.

According to G. R. Rich, chief design engineer of TVA, the facility provided for dissipating the kinetic energy of flood discharges at Fontana is second in interest only to the unusual means used to quickly cool and shrink the concrete. The device adopted to dissipate the energy of 100,000 cfs. of water traveling at a velocity of 150 ft. per sec. is only a smooth and comparatively shallow bucket. Its function is to change the direction of flow from the tunnel with a minimum of shock and disturbance and spread the water out into a relatively thin sheet, projecting it into the air about 150 ft. The horizontal component of the discharge velocity is such that the water will fall about 400 ft. downstream.

It is expected that the falling water will erode the river bed to make its own stilling pool. Heavy riprap will be used to protect the banks and any erosion is expected to occur far enough from the dam that there can be no danger to the structure. This design, proven so far only in laboratory experiments, is believed to have very high hydraulic efficiency despite a minimum cost for installation. Developed by TVA's hydraulic design department, the scheme shows promise of revolutionizing energy dissipator construction for high head dams.

All engineering and construction work is under the direction of C. F. Blee, chief engineer of the Tennessee Valley Authority. G. R. Rich is chief design engineer; A. L. Pauls, chief construction engineer, and James S. Bowman, chief water control planning engineer. F. C. Schlemmer, project manager, is directly responsible for the general supervision over all work in connection with the Fontana project. Oren Reed is construction engineer, and G. E. Murphey is construction superintendent.

[*An article in an early issue will describe the plant and methods used in mixing and placing concrete in Fontana Dam.*]

Earthquake Research Center Proposed For Americas

A central earthquake research center to coordinate and make available seismological data from all parts of America, as an aid to reducing loss of life and property damage such as was caused by recent tremors along the Eastern Seaboard of the United States and Canada, is one of the recommendations contained in a report recently published by the Division of Geomagnetism and Seismology of the Coast and Geodetic Survey.

The report was prepared by the Geodetic Survey and similar services in other American republics as part of a seismological project sponsored by the State Department for the purpose of promoting greater interest and cooperation in earthquake research in the Western Hemisphere and compiling information showing the effects of earthquakes on buildings, bridges and other engineering structures. Besides the United States, cooperating nations included Venezuela, Colombia, Chile, Peru, Ecuador, Panama, Costa Rica, El Salvador and Guatemala.

All of these countries are subject to earthquakes in varying degrees of frequency and intensity, but many of them lack adequate scientific facilities for seismological investigation. Government-sponsored programs in Chile, Ecuador and Guatemala are handicapped by the absence of modern equipment; Venezuela, Peru, Costa Rica and El Salvador have one adequate instrument each for research, but lack official programs; Panama's only source of data is a United States Government station in the Canal Zone and earthquake research in Colombia is conducted almost exclusively by the Jesuit Society, with one good instrument and several older types.

According to the report, at least 11 first-class seismological stations for recording distant shocks are needed in these countries and other parts of Latin America for the compilation of adequate data, and 26 other stations for registering nearby quakes. Of these, five satisfactory long-range stations are in existence in Colombia, Peru, Bolivia, Argentina and Brazil, requiring the modernization of 17 other stations of both types and the construction of 15 new stations. The report also suggests the installation of four accelerographs, for recording destructive earthquake motions, in Guatemala, Venezuela, Colombia and Ecuador, to supplement four existing instruments on the Pacific Coast of the United States and one each in Chile and Peru.

In proposing a central seismological station for all the American republics, the report estimates that annual cost would be less than $25,000 and suggests that operating expenses and overhead might be defrayed by contributions from the American governments participating in the project.

Its tentative functions, as outlined by the Geodetic Survey report, would be as follows:

To establish, maintain and improve instruments and stations and devise new seismological equipment and methods in accordance with unusual local conditions; make regular surveys of all cooperating stations as a means to maintaining high standards of functioning; interpret seismographic records for stations lacking qualified personnel; make preliminary determinations of the foci of strong shocks from telegraphic and other data furnished by selected key stations, and make appropriate laboratory investigations.

Also, to aid the compilation of earthquake data through the use of questionnaires in all countries affected by an earthquake; coordinate and publish information thus obtained and construct isoseismal maps showing the intensity distribution of shocks; make field surveys of areas affected by destructive shocks, where local agencies do not undertake them, for the purpose of gathering engineering data which may lead to safer structural designs in the future, and assist all cooperating units to become self-sustaining in all fields of seismological effort.

Heavy-Duty Runway on Poor Ground

Rhodes E. Rule
Consulting Engineer
Bowen, Rowe and Rule

John F. L. Bate
Engineer in Charge of the Construction
Consolidated Vultee Aircraft Corporation

***Contents in Brief**—Dredged fill under a sub-base of sand topped by a finisher-run course of sand and gravel form the support for a 12-14-in. thick concrete runway over soft ground, designed to take the load of the largest planes. The runway was laid by three pavers working together followed by a single outfit of finishing equipment. Space between the runway and a paved taxi-lane is surfaced with asphalt cement and used to pond water when unusual rainfall exceeds the capacity of the field's drainage system.*

NEARING COMPLETION in San Diego, California, is one of the longest and best constructed airport runways in the country. Scheduled for completion in December, the new east-west runway on Lindbergh Field will be 6,500 ft. long. About 6,000 ft. of the landing strip is now finished and in use by military and commercial aircraft.

Improvement of this municipal airport has been a joint war emergency undertaking financed and directed by Consolidated Vultee Aircraft Corporation and the Navy Department, Bureau of Aeronautics. Designed to accommodate the heaviest type of planes now planned, it should serve San Diego's immediate need for a combined commercial, military and industrial air terminal. However, because of the enormous growth of air traffic in this area, officials of the San Diego Harbor Commission are planning an additional major airport and several auxiliary fields. Upon completion of these, it is probable that Lindbergh Field will be reserved almost exclusively for transport and cargo planes, and for the needs of the aircraft factories located adjacent to the field. This plan has met the approval of the Civil Aeronautics Administration, whose officials have given much cooperative study to the air traffic needs of San Diego.

Because the field lies entirely on land dredged from the adjacent bay bottom, careful consideration had to be given to the design of the foundations. A thorough sub-surface investigation preceded the design. Tests were made to determine the nature and supporting value of the various materials in place. Tests also were made of nearby deposits of sand and gravel available for making the necessary fill and compacted sub-base upon which the finished paving rests.

Materials replaced

Based on subsurface investigations, about 500,000 cu.yd. of unsuitable plastic material will have been removed upon completion of the work and replaced by selected materials of a demonstrated supporting value.

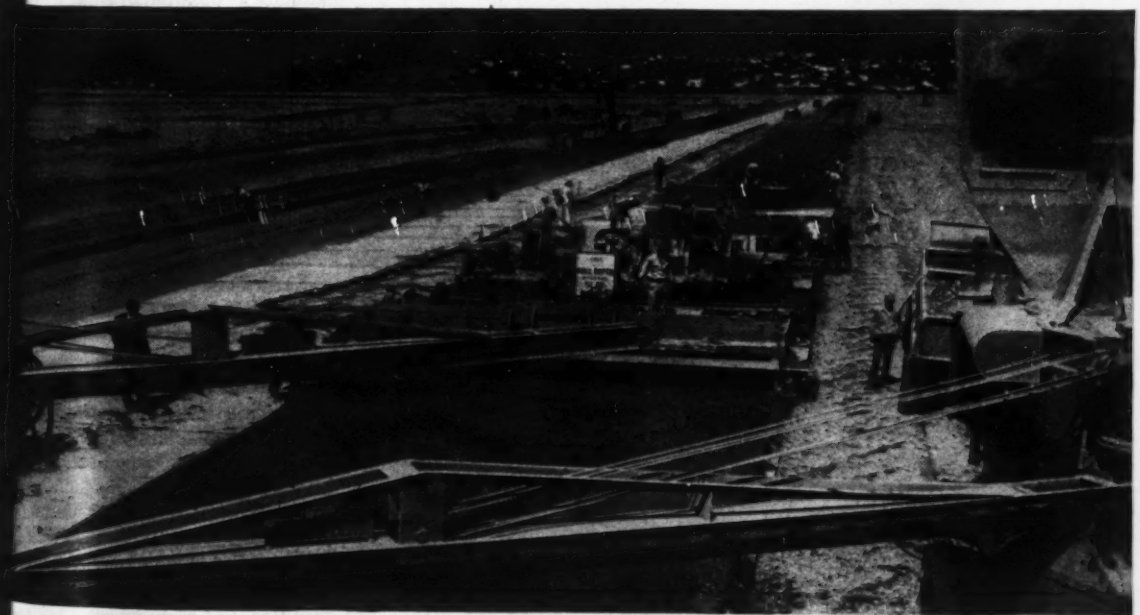


Fig. 1. Three 34E pavers, concrete spreader, full-depth internal slab vibrator, dowel setter, joint machine and finisher placed 2,250 cu.yd. of concrete in a 10 hr. shift on 12-14-in. thick runway at San Diego, Calif.

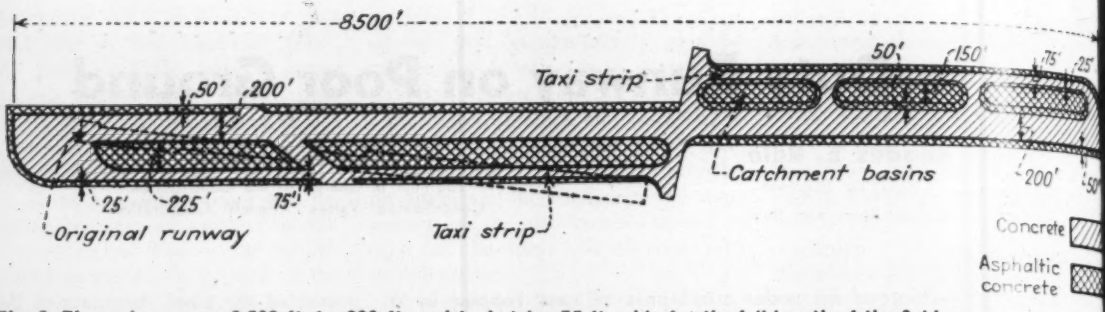


Fig. 2. The main runway 8,500 ft. by 200 ft. and taxi-strips 75 ft. wide for the full length of the field are paved with 12-14 thick concrete. Shoulders of runway, taxi-lane and drainage catchment areas are surfaced with asphaltic concrete.

The replacement materials include pit-run gravel and sand used in the base of the fill, a selected sand base above the common fill, and crusher-run gravel, which lies immediately below and forms the sub-base upon which the pavement rests. All of these materials are required to meet rigid physical acceptance tests to assure that their supporting value will equal or exceed the design computations.

The design of the foundation and pavement was based on an 85,000-lb. wheel load. Results achieved during construction, however, indicate that this may safely be increased to 175,000 lb. per wheel, which is ample to accommodate the heaviest types of planes now contemplated.

The runway is 200 ft. in width and 8,500 ft. long. It consists of a portland cement concrete slab of uniform 12-in. thickness, excepting the easterly end where a 14-in. thickness provides for additional vibration loads in the warm-up area. The taxi-lanes parallel the runway for its entire length; they are 75 ft. in width and of the same thickness as the runway.

Separating the runway and taxi-lanes is a surfaced strip 225 ft. in width divided into a series of flat catchment basins for temporary impounding of storm waters during extreme storms. This intermediate paved area is constructed of asphaltic concrete and similar paving is specified for shoulders, along the pavement—50 ft. wide adjacent to the runway and 25 ft. wide on each side of the taxi-lanes. The area is surfaced for a total width of 575 ft. for the full length of the runway.

Maximum longitudinal grade on the runway is 0.1 percent. This was determined by the extreme flatness of the original ground, not by flight requirements. To facilitate drainage, transverse grades were made somewhat higher than has been the usual practice. The standard runway s tion calls for a 0.5 percent cross f from the center line of the pavem outward on either side for 25 ft. a an increase to a 1 percent grade fr there to the edge of the concrete. T results in a maximum algebraic gra change across the pavement of 1 p cent, occurring at the center line. the taxi-lane it was not consider necessary to flatten the center cro and in this case there is a 1 perc cross fall from the crown in eith direction with a 2 percent algebra change at the center.

Shoulders and intermediate pav areas have a typical cross fall of 1. percent which is reduced where r quired to create drainage divides.

The intersection of the existing r new runways required careful stu of grades to provide as smooth crossing as possible in either directi and yet permit drainage. In the d velopment of these special grades minimum grade of 0.5 percent w adhered to wherever possible and maximum grade change of 0.04 pe cent in 25 ft. along lines parallel the center line. This plan shou assure smooth riding qualities.

Fig. 3. Crusher-run sand and gravel is spread through a bulldozer-mounted box and compacted to support the heavy-duty concrete slab.

Earthmoving on a large scale.

Earthwork is being accomplish by dragline excavation and truck ha to waste disposal areas and by carry ing scrapers where the excavate material is suitable for re-use in th embankment. Imported borrow selected embankment material hauled in by trucks from two separa pits located about five miles awa

The outboard end of the runwa strip extends into tidal flats where, assure maximum settlement prior paving, a system of wellpoints wa installed and pumped until placemen of that portion of the embankme had been completed.

Embankment is placed in 9-in. lifts, compacting to 6 in. Field density determinations are made frequently to check compaction, which was specified to be 90 percent of the A.A.S.H.O. standard, designation T99–38. Actual compaction frequently runs in excess of 110 percent and will probably average more than 10 percent above specification requirements. A field laboratory, under the direction of the construction engineer, is provided for quick determination of compaction and other physical tests required by the specifications.

Well prepared base

A sub-base of select sand topped by crusher-run sand and gravel was designed to meet the assumed loads. The sub-base varies in thickness from 6 to 24 in. depending upon the type and thickness of paving, expected frequency of loading, and nature of the material beneath. Where the fill material already in place is clean sand addition of the select sand course has been omitted.

The sand course is required to equal or exceed a 25 percent California Bearing Ratio value, soaked, and not to exceed one percent swell at four days. Sand is required to be compacted to 90 percent of the A.A.S.H.O. standard with actual field compaction exceeding the specification requirements by a safe margin.

From 6 to 12 in. of crusher-run material is being placed on top of the select sand sub-base. This is laid down in two or three courses, depending upon the thickness. The material is required to have a 2½-in. maximum size, a 95 percent compaction, a California Bearing Ratio of 80 percent or more, soaked, and a swell not to exceed one percent in four days.

In the case of the crusher-run material, considerable difficulty was met with the product of the selected pit. Although generally meeting the specification requirements, it was found that, apparently due to a very small colloidal clay fraction, it was difficult to work the material in the field. It was also found that the 2½-in. maximum size did not permit fine grading sufficiently close to make a suitable pavement sub-grade. To remedy this condition, the contractor closed the setting on the crusher jaws to reduce the maximum size, and also to produce a larger percentage of crushed material. This not only improved the bearing values but also simplified the field procedure for making a close sub-grade. To avoid these difficulties the contractor at times has provided a sand cushion, averaging ¼ in. thick, in preparing pavement sub-grade.

Fig. 4. The slab vibrator, with eight 2-in. dia., 9,500 rpm. "stingers", takes vibration to the full depth of the 12 or 14-in. slab. The machine kept up with three 34E pavers, placing upward of 200 cu.yd. per hour, working less than a fourth of the time. The rig is gas-electric powered with the bar carrying the vibrators controlled hydraulically.

The job involves a total of 103,500 cu.yd. of concrete paving. This is being placed in 25-ft. strips between steel forms. Three 34E single-drum pavers are used together, two on one side of the lane being paved with their skips in opposite directions to accommodate trucks. They are followed by a spreader with horizontal traveling blade and a vibrating screed, a full-depth internal vibrating machine and a dowel setting machine. Behind the dowel equipment, the contractor has a machine of his own design for cutting dummy joints, into which steel plates are inserted and left until the concrete attains sufficient set to stand when they are removed. The surface is obtained with a vibrating finishing machine followed by a final hand finish operation using wood floats and a burlap drag. The average concrete production has been 1,560 cu.yd. for a 10-hr. shift, ranging from 689 to 2,258 cu.yd. for the low and high days.

Deep vibration adequate

Soon after the work was started it was concluded that the concrete was receiving too much surface vibration. Except when required under unusual conditions, the vibrators on the screeds of the spreading and finishing machine are not operated. Ample vibration appears to be provided by the full depth vibrator machine, which is equipped with 8 "stingers" spaced a little more than. 3 ft. on centers except at the edges where the vibrator path is about 6 in. from the side form.

Because of an unsatisfactory local aggregate situation in the San Diego area, the greatest care was given to a study of existing sources of material and the specification of processing and grading requirements. Coarse aggregate is specified in three nominal size fractions—No. 4 screen to ¾ in.; ¾ in. to 1½ in.; 1½ in. to 3 in.

Proportions of these sizes and of sand are varied as required to meet variations in the product of the pit so that the contractor may make the fullest use of the natural product and yet meet the strength specifications.

The material from the pit that passes the 200 screen is believed to carry deleterious matter. To correct this condition the sand is washed twice and a blending sand is added at the batching plant on the job to make up for the deficiency in fines.

Carefully controlled concrete

The attention given to concrete design and job control has been amply repaid in better than anticipated strengths. The specifications provide for continuous job control which has been made the responsibility of a laboratory that provides concrete control inspectors, designs the mixes and maintains continuous checks on the quality and grading of the concrete and its ingredients. The nominal cement content is 1⅜ barrels per cubic yard. This is subject to variation necessary to attain a specified strength of 3,500 psi. under compression and 600 psi. modulus of rupture. The specified slump is 2 in. with the reported average slump to date being somewhat less.

The average reported water cement ratio is about .55 by weight. Two 6 x 12-in. specimens, one for 7-day and the other for 28-day compression tests are secured from each 200 cu.yd. of concrete placed. Two modulus of rupture beams, 6 x 6 x 36 in. are secured from each day's pour. The average 28-day compressive strength to date is 4,000 psi. and the modulus of rupture 700 psi. The comparatively high indicated flexural strength is somewhat above that which was anticipated, based on preliminary investigations and trial mixes.

Secondary surfaces

The shoulders and intermediate area between the runway and taxi-lanes are paved with asphaltic concrete varying in thickness from 3 to 5 in. depending upon surface conditions and anticipated load repetitions. The pavement sub-grade is prepared with a prime coat of medium cut-back (MC-1) liquid asphalt applied at the rate of ¼ gal. per sq.yd. of surface. Asphaltic concrete utilizes 50–60 penetration asphalt and an aggregate grading adapted to meet local conditions and maximum density. The asphalt is placed at a temperature of between 250 and 300 deg. F. with a mechanical spreader and finishing machine used to place it. To assure a well sealed hot joint, laying of strips is limited to a length of 400 ft. before starting the adjoining strip. A seal coat of emulsified asphalt is applied and this is followed by a sand cover.

The current construction program includes an extensive drainage system that will keep the field free of storm waters, except for short periods of maximum storm intensity. Drainage is collected in feeder lines which parallel and runway and taxi-way and flows to three main outfalls extending to tide water in San Diego Bay.

All pipe used is of reinforced concrete, centrifugally spun to meet a test loading of 1,500-D. The pipe is laid on a cradle of gravel and crushed rock having a minimum thickness of 18 in., shaped to fit the pipe and compacted firmly. Catch basins are made of reinforced concrete with cast steel gratings designed to withstand a 85,000-lb. wheel-load, with an allowance of 50 percent for impact. Pipe sizes in the drainage system range from a minimum of 18 in. to a maximum of 54 in.

Cost and management

Based on the engineers' estimate of quantities, the bid price of the general contract was $2,254,000. Additional excavation and other items, together with the cost of engineering supervision and inspection will raise the total cost to about $3,000,000. Unit prices of some important items are:

Excavation	$ .39 per cu.yd.
Imported sand	.63 per cu.yd.
Embankment compaction	.05 per cu.yd.
Crusher run	1.10 per ton
Asphaltic pavement	4.30 per ton
Concrete pavement	9.70 per cu.yd.

The U. S. Navy was represented during the design stages by Capt. A. K. Fogg, USN (CEC) public works officer of the Eleventh Naval District, and during construction by Lt. Commander R. D. Thorsen, USNR, (CEC). Consolidated Vultee Aircraft Corporation was represented by T. W. Van Derveer, plant engineer.

Bowen, Rowe and Rule were retained by Consolidated Vultee as consultants to assist in the design and preparation of plans and specifications, and to give advisory service during construction. Rhodes E. Rule is resident partner for the consultants. Engineer in charge of construction of this project for Consolidated Vultee is John F. L. Bate. P. W. Helsley, in charge of the San Diego division of Smith-Emery Company, is responsible

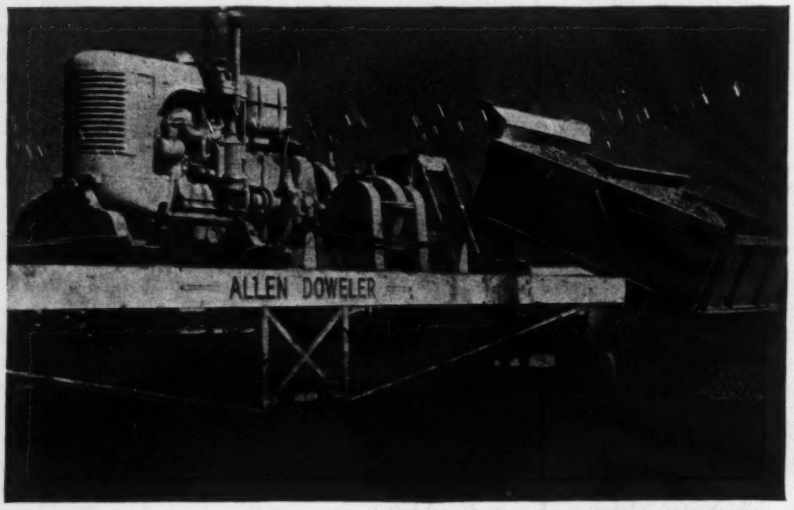


Fig. 5. Machine used to force dowel bars into concrete at transverse joints.

Fig. 6. Plant mix asphaltic concrete is placed 3 to 5 in. thick on shoulders with a conventional spreader and finishing machine. Rolling is done with three-wheel tandem unit.

for all concrete control and many of the physical acceptance tests.

The general contract was let to Casson and Ball of Berkeley, Calif. on May 19, 1944, with completion expected within 180 days. The contractors are represented on the work by Stanley Ball and Leo G. Lynch, partners, and Leonard Krull, general superintendent.

Construction of the drainage system is being performed by Artukovich Bros., sub-contractors under Casson & Ball. All electrical facilities, including a most modern system of flush lighting for the runways, are being provided and installed by R. E. Ziebarth, under separate contract.

Costa Rica Dedicates Largest Central American Water Filtration Plant

Dedication recently of the Tres Rios water filtration plant, largest and most important of its class in Central America, gave San Jose, Costa Rica, double the supply of pure water which it had been receiving, according to an announcement by Dr. Solon Nunez, director of the Costa Rican Health Department.

Construction on the $250,000 filtration plant was begun in January, 1943, under the terms of an agreement signed between the Costa Rican government and the Institute of Inter-American Affairs, an agency of the Office of Inter-American Affairs in Washington. Despite an unavoidable interruption of four months, construction of the plant was completed on schedule.

The plant is of the slow sand filter type, with supporting concrete work designed to resist stresses and strains originated by earthquakes in the area.

The plant consists of a large sedimentation tank with a capacity of approximately 1,453,000 gal., three slow sand fllters with an area of half an acre each, chlorination facilities and mechanical sand washers to clean the filters.

Retention period of the sedimentation tank is six hours. The filters themselves will permit water passage at the rate of 6 mgd., utilizing a 40-in. layer of fine sand on top of an 18-in. layer of gravel.

The filtered water is then chlorinated before distribution to the city.

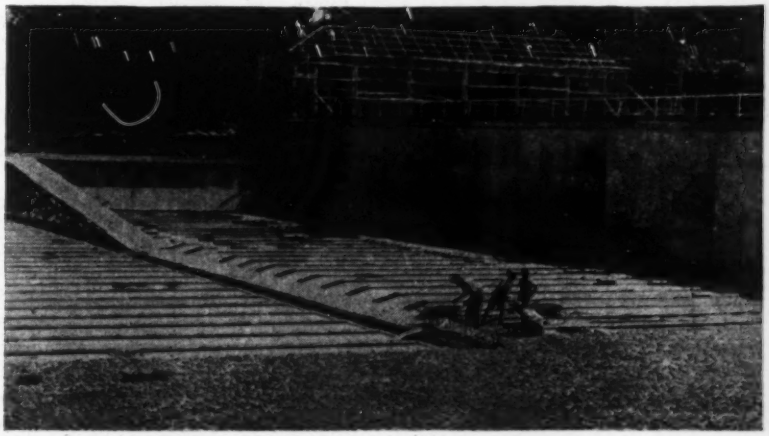


Fig. 1. Slow sand filters of new Costa Rican water filtration plant doubles pure water supply to capital city of San Jose.

Shallow Wells Tap Dismal Swamp For a City Water Supply

Contents in Brief—An increased water supply of 400,000 gpd. was obtained at Elizabeth City, N. C., by constructing 109 gravel-packed shallow wells in Dismal Swamp, where the water table varies from ground level to a few inches below. To build a well, a 10-in. dia. casing about 30 ft. long was jetted into place, and after it had been cleaned out a 2-in. dia. pipe ending in a 5-ft. long screen was inserted and packed with gravel, the casing then being removed. Water from the wells is drawn to a central pump house by an extensive piping network in which a vacuum of 15 to 24 in. is maintained.

DEMANDS FOR MORE WATER at Elizabeth City, N. C., due to the influx of war workers, the expansion of local shipyards and the construction of nearby military bases, have been met by construction of a 250-acre field of shallow wells in the Dismal Swamp area west of the city. The type of shallow well found most satisfactory to provide water of low chloride content, and the vacuum system of water collection add unusual interest to this supply project.

For several years Elizabeth City has needed better water. Until about a decade ago the city obtained its supply from Knobbs Creek. Most of the city lies from 5 to 10 ft. above sea level and no part of the surrounding counties is more than 17 ft. above that elevation. In the fall of 1929, because of a prolonged drought, salt water from the sound and ocean backed up into the surface supply of Knobbs Creek and a reservoir on that stream began to show excessive chloride content, due to the seepage of salt water through the sand beds between the upper and lower creek area. All efforts made to prevent the seepage were unsuccessful.

Extensive studies to develop a new source, including the analysis of the flow from several wells, indicated that water from wells deeper than 300 ft., and possibly less, was too salty for a municipal supply; however, it was revealed that good water could be obtained from shallow wells situated far enough from tidal streams to prevent the inflow of salt water during heavy pumping. As studies continued it was determined that the Dismal Swamp area offered a good location for a shallow well field.

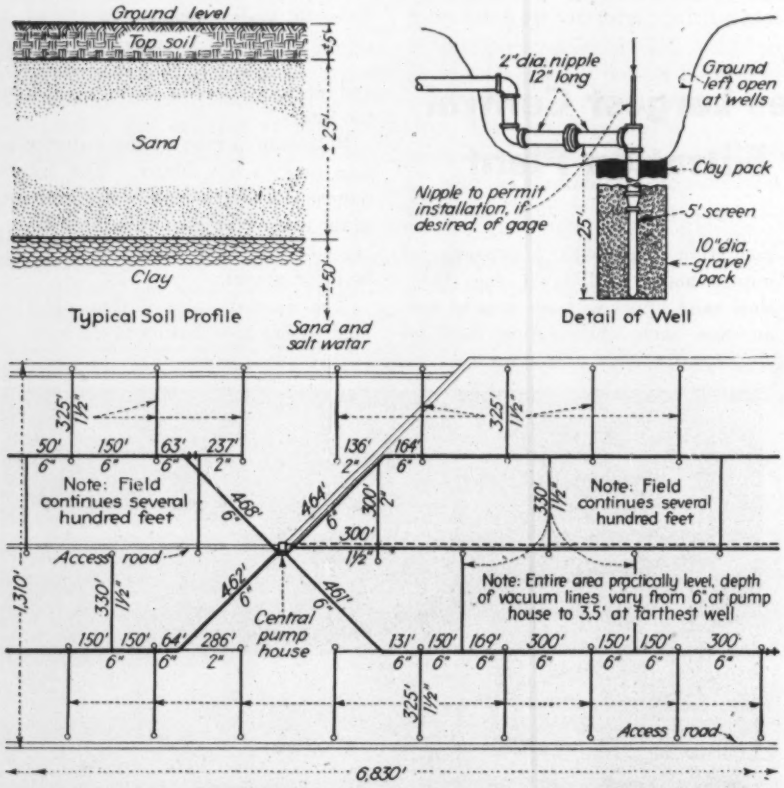


Fig. 1. New well field, the central portion of which is laid out as above, covers about 250 acres and consists of 109 shallow wells of design illustrated at upper right. Investigation revealed that the typical profile of the upper soil strata was as indicated at the upper left and that these strata would produce a water of low chloride content, while deep wells would be unsatisfactory.

Site of low elevation

In this region the natural ground level is at an elevation of about 16 ft. and much of the area is covered with second-growth timber, the remainder being open swamp. The water table is within a few inches of the surface at all points. The typical soil formation (Fig. 1) consists of about 5 ft. of topsoil over approximately 25 ft. of fine sand, followed by about 50 ft. of clay, below which sand and salt water are encountered. Salt content of the water is about 15 ppm. in the upper sand layer, 300 ppm. at a depth of 75-100 ft., and 5,000 ppm. at 600 ft.

In 1935 the city put down 64 shallow wells ending in the upper sand layer, followed by 31 more in 1936. Spread over an area of about 150 acres, this field has continued to produce a good water with the yield in the neighborhood of 5 gpm. per well. Major trouble in operating the wells has been the entrance of fine sand into the piping system and the clogging of

he strainers. Experiments with sev-ral types of gravel packing and dif-erent kinds of screens resulted in uch added knowledge as to the best ype of well to build and type of pip-ng to install. This information was tilized to good advantage in con-tructing the new wells.

Increased demands in Elizabeth City since war began indicated that at least 400,000 gpd. more water was required. To meet this increase, 109 shallow wells have been constructed. The wells are spaced about 325 ft. apart (Fig. 1), which is a much wider spacing than with the older wells.

Details of a typical new well are shown in Fig. 1. A study of this drawing shows that the pipe of the well is of 2-in. diameter and that it ends in a slotted screen 5 ft. long and of 1¼-in. diameter. A 10-in. dia. gravel pack sealed at the surface by 2 to 3 ft. of clay surrounds the pipe and screen.

Experience with the old wells revealed that the best type of sieve for the fine sand encountered is a welded slotted screen with No. 20 openings (0.020 in. wide) and that the most satisfactory size material for the gravel pack is of $\frac{1}{16}$ to $\frac{1}{8}$-in. diameter. This design reduces to a minimum the entrance of sand into the piping system. Neither do the openings clog readily with oxidized iron, as with some types of screens. When a strainer does become clogged and production of the well is severely reduced, the most satisfactory repair procedure is to take the well out of operation and to add inhibited hydrochloric acid. After a few hours the oxide incrustation is destroyed and the capacity of the well returns to normal.

When the city first began experimenting with wells, an individual pump was installed at each well. However, because of the limited depth of the shallow wells it was found that by using a vacuum collecting system it was possible to draw from 5 to 10 gpm. from each well. This small flow is due to the relatively low permeability of the underlying sand and the limited drawdown available; the supply of underground water is derived chiefly from precipitation, rather than through percolation into the area.

Such a low unit production made necessary a large number of wells in the new field. In turn, the numerous wells, coupled with the almost uniform elevation of the field, made a single combination collecting and

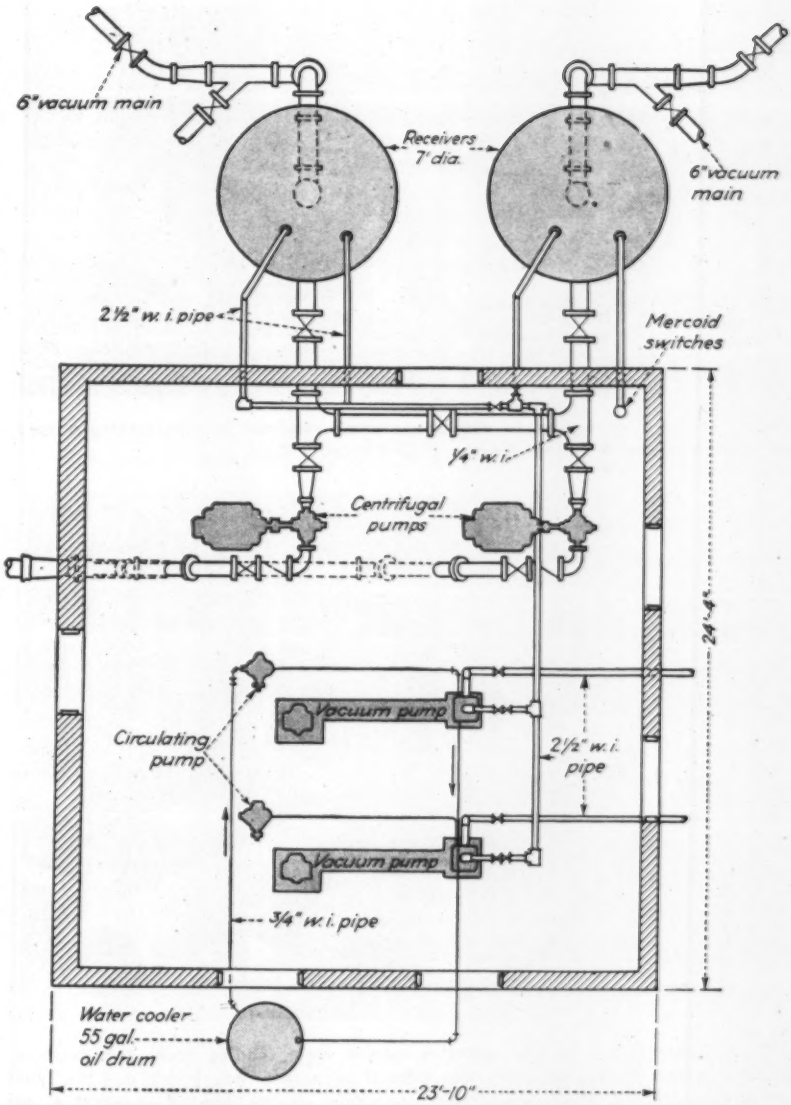


Fig. 2. Flow from the wells in the new field is drawn to a central pumping station by two pumps maintaining a vacuum of 15 to 24 in. in the 5-mi. collecting network of pipes. Two centrifugal pumps deliver the water from the station to the existing facilities.

pumping station to which the water from all the new wells is drawn by vacuum more economical and practical than any other method of collecting the water.

The wells are joined to the central pumping station by a piping system in which a vacuum of 15 to 24 in. is maintained automatically by two water-cooled pumps, the field being divided into four areas to permit a portion of the wells to be shutdown while the remainder continue to operate. Also, any individual well can be shut off without interfering with the operation of the other wells.

The pipes diminish in diameter from 6 in. at the pumping station to 1½ in. at the most distant well. The collecting pipe, which totals 5 miles in length, is of wrought iron with screw joints.

When the water reaches the pumping station it passes through one of two vacuum receiving steel tanks 7 ft. in diameter and 8 ft. high (Fig. 2). From this point the water, which normally contains a carbon dioxide content of 80 ppm. and a chloride content of 18 to 20 ppm., is delivered through a new 10-in. dia. line by two 6-in. dia. centrifugal pumps to an existing reservoir 1¼ miles away. The water is treated with an excess of lime, and sodium hexametaphosphate is also added for stabilization.

Fig. 3. Oxcarts were used to deliver materials required in constructing a field of shallow wells in Dismal Swamp near Elizabeth City.

Fig. 4. Construction of the asbestos-cement main leading from the pumping station to the existing facilities was difficult because of heavy rain and the type of terrain crossed. Most satisfactory procedure was to dam off about 75 ft. of trench, build this much of the line, and then move forward.

Total demand on the 109 new wells to meet present needs of Elizabeth City is 400,000 gpd. or less than 5 gpm. per well. However, it is believed that the field could produce 720,000 gpd. without critical waterable reduction.

Construction a difficult job

Since the work had to be done during the rainy part of the year, construction of the new well field and the necessary piping network was no easy task. Because of the high water table, root growth, and the type of soil encountered, it was impossible to use mechanical equipment for any of the construction operations. As a result, oxen were employed to deliver supplies (Fig. 3), and hand tools were used to construct the wells and to install the piping system in the field.

The most satisfactory procedure in putting down a well was to first install, by jetting and with the aid of a gin pole, a 10-in. dia. steel casing about 30 ft. long. After the casing had been cleaned with water, the permanent 2-in. dia. pipe and strainer were inserted and the remaining space in the casing filled with gravel. Finally, by means of two hand-operated railroad jacks, each of 20-ton capacity, the casing was removed.

By this method five men were frequently able to build three wells during an average 8-hr. day. However, many days were lost because of rain, and the daily average was lower.

Construction of the collecting network of pipes also was time-consuming. Delivery of pipe to the desired point was a slow job, day labor was hard to obtain, the extensive root growth created a major excavation problem, and the heavy rains caused numerous delays.

The trenches for the pipe were normally made 2 ft. deep. About half of the ditches were dug by hand, but the excessive root growth required the use of dynamite to construct the remaining trenches. Forty percent dynamite proved best in this work. It was placed in 1½-in. holes on about 4-ft. centers, one stick being used in each hole. The usual procedure was to open up about 150 ft. of trench at each blast. Following the explosion, some hand work was required.

After a length of the pipe had been assembled outside of the trench, it was lowered into the water-filled ditch, tested with compressed air and backfilled. In attaching the collecting pipe to that in the wells, provision was made to permit the installation of a gage at each well. This will permit an easy check if the vacuum at a given point is considered insufficient.

The 1¼-mi. main of 10-in. dia. leading from the pumping station to the existing reservoir was built of asbestos-cement pipe. In laying this line, a short length of the trench—usually about 75 ft.—was dammed off, pumped out, and after the pipe had been laid, backfill was added between joints to keep the pipe from floating when operations were transferred to the next section. One portion of the line was supported on timber pile bents. Despite the several difficulties a 14-man crew, not including the ditchers, was able to lay 300 ft. of the asbestos-cement pipe per day.

Cost of the new wells was $80,000 with a major portion supplied by the Federal Works Agency, which was represented by C. L. Vickers, regional director at Richmond, Va., and C. L. McGee, construction engineer. Paul Van Camp, Pinehurst, N. C., was consultant. For the city, J. C. Parker is superintendent of the public utilities commission, and R. W. Luther, water superintendent.

Newton A. K. Bugbee & Co., Trenton, N. J., was the general contractor. This firm was represented by Austin R. Culp, superintendent of construction; Joseph Larry, in charge of the dynamiting work, and John Keyes, in charge of the pipe laying operations.

ENGINEERING ABROAD AS SEEN BY ENR EDITORS

Field and Office Items from the Pacific

N. A. Bowers
Pacific Coast Editor, Engineering News-Record

eel Beams Retaken From Japs

A present from Tojo, highly appciated by our construction forces t in the Pacific, was received by val construction battalions working one of the Marshall Islands early st Spring.

To understand the significance of is present it must be remembered at Navy construction forces are rking hard to provide the materials eded for these far-distant outposts. ng, heavy steel beams are a particurly critical item, and getting the aterial delivered to the desired spot t in the Pacific is sometimes an en more difficult job than obtaining in the States.

The director of the Bureau of Yards Docks, Pacific Division, was there- re naturally much pleased when an spection trip through the Marshall lands brought to light the fact that Jap camp recently captured had in e materials storage about a dozen -in. beams of heavy H section 60 ft. ng. Examination showed marks hich definitely proved this steel to be of U. S. manufacture, captured by the Japs and now retaken by our forces. The net result is that the Nips brought the material from a place where we don't need it now to a point where it will be extremely useful.

The story really began some 3 years ago when the U. S. Navy planned to build a seaplane ramp at Wake Island and shipped out there for that purpose from Pearl Harbor stock some heavy, steel H-beams. These beams were part of contract NOy4173; order number and destination code mark were imprinted on each piece. However, before the ramp was started, the Nips violated their treaty agreements, grabbed what they could (incidentally taking on some heavy obligations that are only now beginning to be paid off).

The 60-ft. H-beams that disappeared on Wake Island were listed as war losses. Now that these same beams come to light in the Marshall Islands they can be fitted into any one of several construction projects in which heavy steel will be used, thereby simplifying by just this much our supply and delivery problem, thanks to Tojo.

Concrete or Wood Tent Floors?

Captured Jap cement was available and lumber was not, when tent floors were wanted recently on a Pacific atoll. Navy Seabees, therefore, used what materials there were, and found that cement and coral, mixed with seawater, made very satisfactory floors. With a reasonably well-compacted foundation, a 1½-in. thickness of the concrete was found to be adequate in all respects. The concrete was laid with the observation that it could be

Comparative Estimates on Concrete and Wood Tent Floors

	Cargo Space (cu. ft.)	Weight (lb.)	Cost at U. S. Port (dollars)
Lumber	22.2	844	11.12*
Cement	4.75	475	2.62#
Saving by use of concrete (percent)	79	44	76

*Lumber $36/m.
#Cement $2.21/bbl.

Steel H-beams, rolled in the U. S., recaptured from the Japs on Berlin Island. Left: Markings on steel that the Japs captured, transported and finally lost.

easily broken up later if the area had to be cleared for other uses.

Based on this experience the commanding officer put together some figures for the purpose of comparing concrete and lumber floors. He figured that the standard 16x16-ft. tent floor, 1½ in. thick, would use 32 cu.ft. of concrete. With four sacks of cement per cu.yd. each floor would require 4.75 cu.ft. of cement weighing, say, 475 lb. Correspondingly, figuring in the bill of material for the lumber five 16-ft. pieces of 2x4 and 24 pieces of 1x8, the lumber requirement would be 309 ft. b.m. or 22.2 cu.ft. dressed, weighing, say, 844 lb.

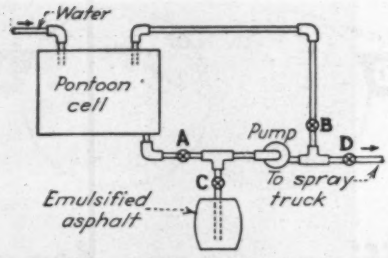
For convenience, the comparative figures, strongly favoring concrete, are arranged in the accompanying table. The comparison does not allow for forms, screeds and tools required, nor for the fact that concrete involves somewhat more labor, that cement requires more care in shipping and storing and that, unlike lumber, there is no salvage in a concrete floor. On the other hand, the concrete is more sanitary and does away with the breeding places for rats and vermin afforded by space under wood floors.

Pump Speeds Road-Oil Mixing

The thorough admixture of water and emulsified asphalt in the desired proportions for surfacing an airstrip was expedited by the arrangement of pump and connections shown in the accompanying sketch. With this combination it was necessary to use only one container, in addition to the drums in which the emulsified asphalt was delivered, in order to supply a thoroughly mixed combination of the emulsion and water to the tank trucks that sprayed it on the airstrip.

The large container in which the batches were mixed was one of the standard 5x5x7-ft. Navy pontoon cells into which water could be discharged from the local water supply system. The contents of this tank could be forced to circulate by a 55-gal.-per-min. pump so placed with respect to the four valves that two sources and two discharge points could be used.

With valves A and B open and the others closed the contents of the tank could be rapidly mixed by being circulated through the pump and dumped back into the tank. With valves C and B open, while the others remained

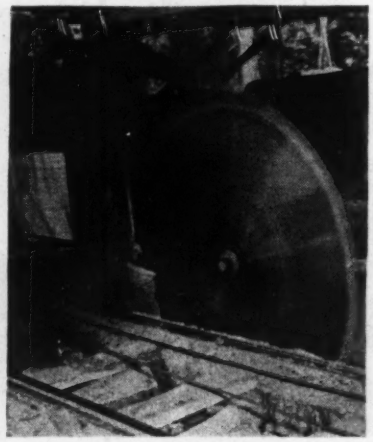


Tank and pump connection that speed up the mixing of water and emulsified asphalt on airstrip and road jobs.

closed, the desired quantity of emulsified asphalt from the delivery drum could be transferred to the mixing tank. Finally, with A and D open and the other valves closed, the well-mixed solution could be pumped into a tank on a motor truck used for distributing the mixture on the airstrip.

Saw Cutting Mahogany Logs Requires Cooling Jet

Sawmills operated by naval construction battalions in the Solomons and New Guinea do much of their work on hard wood. No means of accurately classifying or naming the kinds of trees have been available in the field but the Seabees are well aware that the wood is of extremely close grain, very hard and quite heavy —much of it is too heavy to float. The only saws on hand had teeth made for woods grown in the United States. Such saws heat up excessively in cutting the hard native logs and require to be cooled by a jet of water directed against the saw teeth just ahead of the contact with the wood.

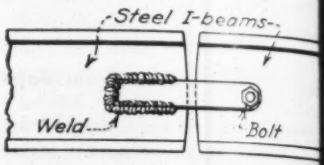


Jet of water directed against teeth of circular saw helps dissipate heat.

Joint in Frame Relieves Strain in Marine Railway Car

A marine railway car, of 25-ton capacity, was built from materials the Seabees could find readily available. The main longitudinal members were 40-ft. steel I-beams, each carried on three trucks. This length proved too great for desirable flexibility in the frame; when the car operated under load wheels showed excessive wear as the result of strains caused by binding.

A remedy was found in an articulated connection made by cutting through each I-beam at two points (one cut between trucks). The load, always tension, was carried across these cuts by a pin-connected joint as shown in the accompanying sketch. This change did away with the binding.



Detail showing steel link across cut in the I-beam. This relieves strain, transmits tension.

Tie-Downs for Quonset Huts

Tie-downs for Quonset huts have been useful in exposed locations in helping the huts withstand high winds. In one camp tiedowns were made with that kind of steel wire mesh in 6- or 8-ft. widths that had steel rods placed transversely at intervals. Strips of this mesh were put over the roof at each end of the building. When so placed the final transverse rod at each end of the strip of mesh was fastened to a deadman by three tierods. These tierods were usually looped over the terminal transverse rod or tied to it by twisted wires and, at the other end, bolted to the dead-man.

Fastened down in this way, huts on the exposed face of a hill safely withstood a storm in which wind velocities are believed to have been between 60 and 70 m.p.h. These Quonset huts were of the type with projecting roof at either end to shelter a porch. Without the tie-downs it is thought to be questionable whether they would have withstood this storm.

The Navy's Famous Quonset Huts Are Built By

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DIVISION OF GREAT LAKES STEEL CORPORATION, PENOBSCOT BUILDING, DETROIT 26, MICHIGAN

UNIT OF NATIONAL STEEL CORPORATION

Wise communities are today planning construction of institutional buildings, hospitals, schools and welfare or health centers, replacing the old with new, efficient designs.

In many such developments, Stran-Steel plays a prominent part in the plans. Its strength, durability, permanence and fire-resistance recommend it for economy of construction and maintenance, while the advantage of Stran-Steel's patented nailing groove provides full scope in the selection of collateral materials. Leading architects and engineers are thinking in terms of Stran-Steel construction.

Stran-Steel's present production is for military buildings, but the experience gained will be available to the construction industry soon. Investigate Stran-Steel; explore its possibilities.

CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

STORM SEWERS, OKLAHOMA

OWNER: City of Tulsa, Okla.; Dan W. Patton, city engineer.

PROJECT: Construction of reinforced, semi-elliptical, monolithic concrete storm sewer in White City Addition, east of Yale Drive, Tulsa, Okla. (No. 10-42). Sewer serves White City, Yale Heights and Franklin Second Additions.

CONDITIONS: Contractor to furnish all materials and complete work in 120 working days. Highway transportation facilities available to site of project. Wage rates are: skilled labor, $1.50 per hour; semi-skilled, $1.00; and common, 80c.

BIDS: Six bids were received July 7, 1944, ranging from the contract low of $51,322 to $54,655. Engineers estimate, $56,905.

LIST OF BIDDERS:

1. F. M. Stowell, Tulsa, Okla. (contract) $51,322
2. H. J. Happel, Tulsa, Okla. 53,188
3. Eckles Constr. Co., Tulsa, Okla. 53,908
4. Foster Construction Co., Tulsa, Okla. 54,156
5. Henryetta Constr. Co., Henryetta, Okla. 54,587
6. S. R. Smith & Jack E. Stegall, Tulsa, Okla. 54,655

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Earth excav. and backfill	2,993 c. y.	$1.00	$2.00	$1.50
2. Rock excav. and backfill	2,991 c. y.	3.25	2.00	2.50
3. 66-in. rein. semi-ellip. monolithic conc. sewer (excl. steel) Type I	460 l. f.	8.70	9.30	9.30
4. As above, Type II	255 l. f.	8.70	8.50	8.70
5. 60-in. rein. semi-ellip. monolithic conc. sewer (excl. steel)	489 l. f.	8.50	8.20	8.60
6. 54-in. rein. semi-ellip. monolithic conc. sewer (excl. steel) Type I	689 l. f.	6.34	7.30	7.10
7. As above, Type II	142 l. f.	6.34	6.80	7.00
8. 48-in. rein. semi-ellip. monolithic conc. sewer (excl. steel)	547 l. f.	5.50	6.10	6.30
9. As above, 42-in	1,361.7 l. f.	4.75	5.30	5.35
10. 4x2-ft. rein. mono. conc. box section sewer (excl. steel)	750.9 l. f.	5.20	6.30	6.50
11. 6-ft. rein. mono. connector 66-in. to 60-in. (excl. steel)	1 ea.	67.00	60.00	67.00
12. As above, 60-in. to 54-in	1 ea.	63.00	60.00	63.00
13. As above, 54-in. to 48-in	1 ea.	45.00	50.00	45.00
14. As above, 48-in. to 42-in	1 ea.	38.00	35.00	38.00
15. 6-ft. rein. mono. conc. connection, 42-in. to 4-ft. 3-in. box (excl steel)	1 ea.	63.00	65.00	63.00
16. 8-in. sewer pipe san. sew. revision	1,650 l. f.	.75	.70	.85
17. Conc. cradle for 8-in. san. sewer	1,650 l. f.	.65	.70	.65
18. 15-in. precast conc. sewer pipe (stubouts)	200 l. f.	1.35	1.35	1.35
19. As above, 18-in	200 l. f.	1.60	1.65	1.60
20. Standard manholes (to 6-ft. depth)	19 ea.	75.00	75.00	75.00
21. Additional feet of manhole	35 ft.	7.00	9.00	7.00
22. Reinforcing steel for sewers	75,000 lb.	.06	.0575	.06
23. Remove, replace conc. pavement	50 s. y.	3.90	4.25	3.90
24. Remove 2x2¾-ft. conc. box	1 ea.	40.00	40.00	35.00

RESURFACING ROADS, INDIANA

OWNER: Indiana State Highway Commission, Indianapolis.

PROJECT: Resurfacing 13.27 miles of roadways with hot-mixed hot-laid bituminous base binder courses, and rock asphalt surfacing. Improvements are in Fort Wayne and Greenfield Districts, in Jay and Blackford Counties, Indiana. State Road No. 1, Section N (11 mi.) is from Jay-Wells County Line northward to Bluffton; State Road No. 1, Section M, (1 mi.) in Pennville; State Road 22 (1 mi.), in Hartford City; and State Road No. 26 (0.6 mi.) in Hartford City.

CONDITIONS: Contractor to furnish all materials and complete work in 111 working days from Aug. 31, 1944. Highway transportation facilities available. Wage rates specified are: skilled labor, $1.00 per hour; semi-skilled, 75c.; common, 65c.

BIDS: Four bids were received August 8, 1944, ranging fr the contract low of $250,812 to $294,880. Engineer's estim $295,065.

LIST OF BIDDERS:

1. Wayne Paving Co., Fort Wayne, Ind. (contract) $250,
2. Hipskind Drainage Co., Fort Wayne, Ind 257,
3. Middle West Roads Co., Noblesville, Ind 268,
4. John Dehner Co., Inc., Fort Wayne, Ind 294,

Road 1—Section N

Item	Quan.	Unit Prices (1)	(3)
1. Bitum. material for prime	28,000 gal.	$0.11	$0.12
2. Bitum. material for prime base	2,200 gal.	.12	.12
3. Subgrade fine aggregate	1,000 ton	3.00	3.00
4. Bitum. conc. base (hot-laid)	8,710 ton	6.13	6.25
5. Bitum. conc. binder (hot-laid)	14,200 ton	5.02	5.20
6. Rock asphalt	4,260 ton	14.55	15.00

Road 1—Section M

7. Bitum. material for prime	4,600 gal.	$0.11	$0.12
8. Bitum. conc. binder (hot-laid)	2,350 ton	5.49	5.60
9. Rock asphalt	705 ton	15.02	15.40

Road 22—Section MM1

10. Bitum. material for prime	5,200 gal.	$0.12	$0.12
11. Bitum. material for prime base	200 gal.	.13	.12
12. Subgrade fine aggregate	150 ton	3.00	4.00
13. Bitum. conc. base (hot-laid)	130 ton	7.22	6.95
14. Bitum. conc. binder (hot-laid)	3,125 ton	6.11	6.20
15. Rock asphalt	750 ton	15.64	15.50

Road 26—Section MM

16. Bitum. material for prime	200 gal.	$0.12	$0.12
17. Bitum. conc. binder (hot-laid)	85 ton	6.11	6.20
18. Rock asphalt	26 ton	15.64	15.50

HIGHWAY IMPROVEMENT, NEW HAMPSHIRE

OWNER: New Hampshire State Highway Dept., Concord.

PROJECT: Improving 11 miles of logging road (gravel) towns of Stratford and Odell, Coos County, N. H. Width 12-ft., depth of gravel is variable.

CONDITIONS: Contractor to furnish all materials exc for gravel which is to be obtained from designated borr pits. Rail and highway transportation facilities availab Completion time: December 15, 1944. Logging road not be built to regular standard; to be used in getting out lumb for war purposes. Wage rates are: skilled labor, 75c. to $1. per hour; semi-skilled, 75 to 90c.; and common, 60 to 8

BIDS: Five bids were received September 22, 1944, rang from the contract low of $46,135 to $81,600.

LIST OF BIDDERS:

1. M. DeMatteo Constr. Co., Quincy, Mass. (contract) .. $46,
2. Kenneth E. Curran, Littleton, N. H. 54,
3. W. H. Hinman, Inc., North Anson, Me. 67,
4. Rome Construction Co., Holden, Mass. 70,
5. Henley-Lundgren Co., Worcester, Mass. 81,

Item	Quan.	Unit Prices (1)	(2)	
1. Clearing and grubbing	36 ac.	$100.00	$150.00	$100
2. Unclassified excav., incl. borrow	40,000 c. y.	.45	.45	
3. Unclassified trench excavation	400 c. y.	2.00	3.00	
4. Unclassified structure excavation	100 c. y.	1.25	5.00	
5. Gravel borrow, base	16,800 c. y.	.70	.90	
6. 15-in. plain concrete pipe	2,400 l. f.	2.00	3.00	
7. 6-ft. span log culvert	8 ea.	150.00	75.00	
8. 10-ft. span log culvert	5 ea.	250.00	200.00	
9. 16-ft. span log culvert	4 ea.	400.00	250.00	
10. 28-ft. span timber bridge	2 ea.	700.00	1,200.00	1,5
11. 64-ft. span timber bridge	1 ea.	1,600.00	2,500.00	5,0

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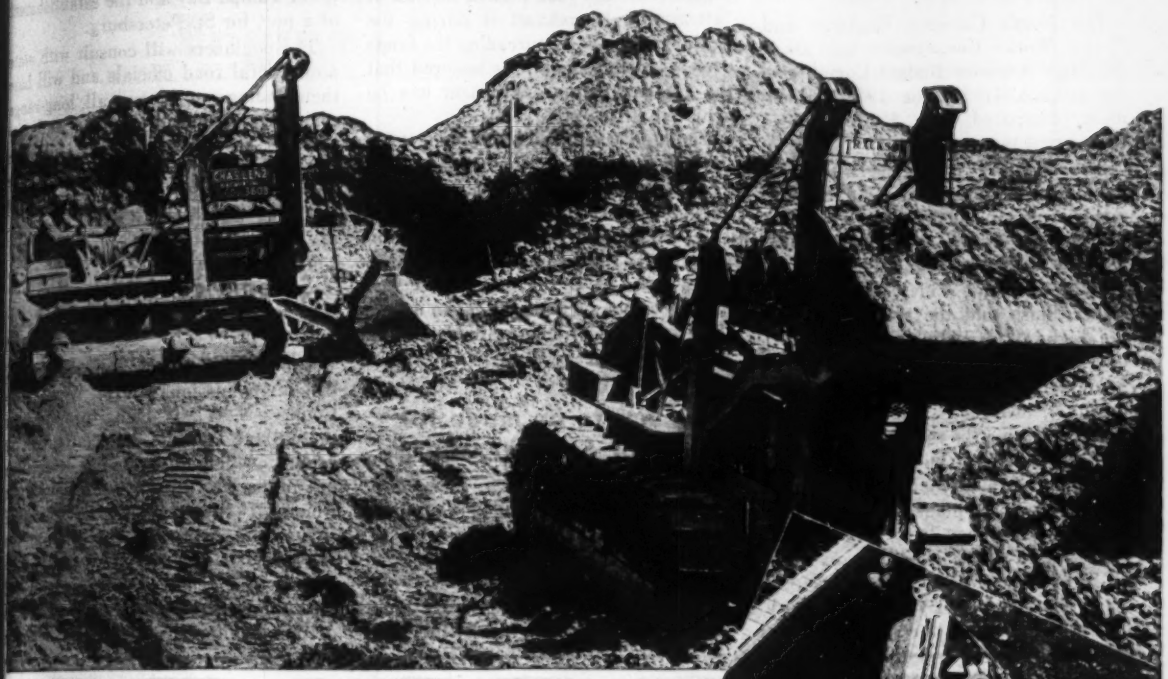

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DIGGING and LOADING

MATERIAL HANDLING

TRAXCAVATOR

The Original Tractor Excavator

(Continued from page 73)

North Carolina wants big road fund for 1945-7

The North Carolina Highway and Public Works Commission has asked the State Advisory Budget Commission for $90,026,947 for the 1945-47 biennium, compared with $64,692,092 in the current two-year period.

The highway program, calling for the largest road rebuilding and improvement program in the State's history, provides for a 1945-46 budget of $42,558,708 and a 1946-47 budget of $47,468,239, and Chief Engineer W. Vance Baise told the commission that the highway department expects $67,060,000 in receipts during the next biennium, compared with $64,671,558 during 1943-45.

In presenting the request for approval of the $90,026,947 budget for the next biennium, the state highway department officials said that plans for the expenditure of this money "are about all we can take up under conditions expected to prevail then." Wartime restrictions have left a need for highway expenditures "far beyond our capacity," and the proposed budget is based on the idea of spending the highway fund surplus over a 4-year period, instead of "attempting to exhaust it during the next biennium." By spreading the funds over a 4-year period, it is believed that the greatest permanent benefit can be achieved, it was said.

The highway commission's budget for the current fiscal year amounts to $37,942,099 and is designed to permit the beginning of road construction by July 1 if the materials and labor situation permits. To this an unexpended balance of $39,891,719 at the end of the last fiscal year can be added to make up the total amount of funds available during the 12-month period.

• • •

Survey to be made for port of St. Petersburg

The port authority of St. Petersburg, Fla., has retained two engineering firms —Bail, Horton and Associates of Ft. Myers, Fla., and Parsons, Brinckerhoff, Hogan and MacDonald, of New York, to make a survey of the Pinellas Point area. In the next few weeks they will present to the city, preliminary plans for some form of transportation across lower Tampa Bay and the establishment of a port for St. Petersburg.

The engineers will consult with state and federal road officials and will base their findings on the over-all, long-range plan of transportation. The authority believes establishment of adequate transportation between Pinella County and Manatee and Sarasota counties on the other shore a vital need.

• • •

Stream control body urged in Westchester Co.

The creation of a county stream control commission for Westchester County, N. Y., is being proposed by the Village Officials Association of the county. A committee of the association has prepared a draft of a proposed act which, if approved by the board of supervisors, will be submitted to the state legislature.

The stream control commission would be vested with authority to determine design standards of flood flows to be

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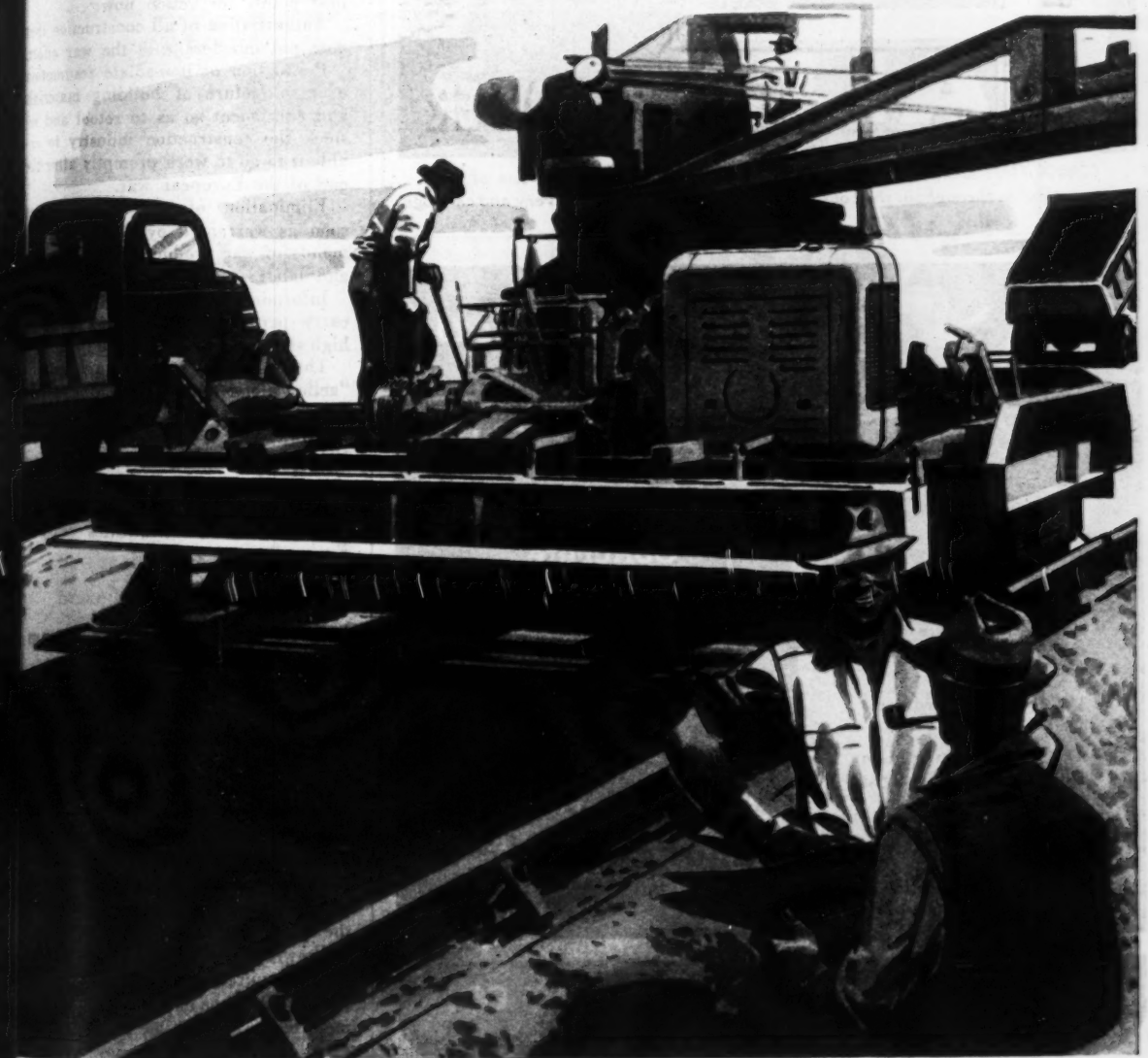

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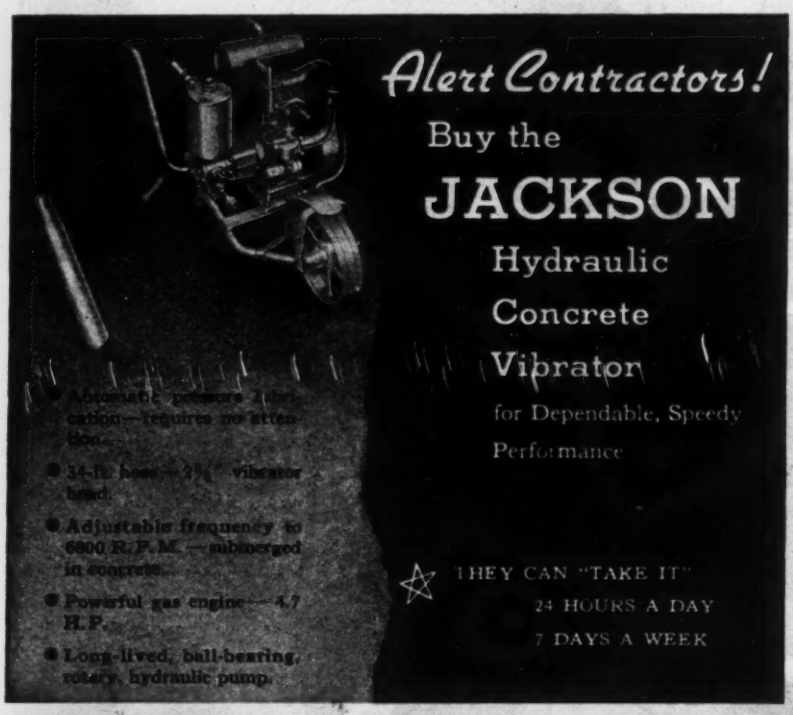

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used on all drainage improvements so that uniformity of basic design would be obtained through the entire length of a stream and thus control could be attained in the lower reaches where flood conditions are usually the worst.

It is proposed that the commission consist of the county commissioner of public works, the director of the sanitation division of the county department of health, the chairman of the county planning commission, and two others appointed for 3-year terms by the county executive.

• • •

For early reconversion of building industry

Immediate steps for reconversion of the construction industry to peacetime production have been urged upon the War Production Board by the recommendations committee of the National Committee on Housing, suggesting these four points for action now:

Authorization of all construction that does not interfere with the war effort.

Permission of immediate resumption of manufacture of building materials and equipment so as to retool and restock the construction industry to enable it to go to work promptly after the end of the European war.

Elimination of all restrictions as soon as warranted by diminishing demands of war production for materials and labor.

Informing the public that these steps carry permission to build again with high standards of design and quality.

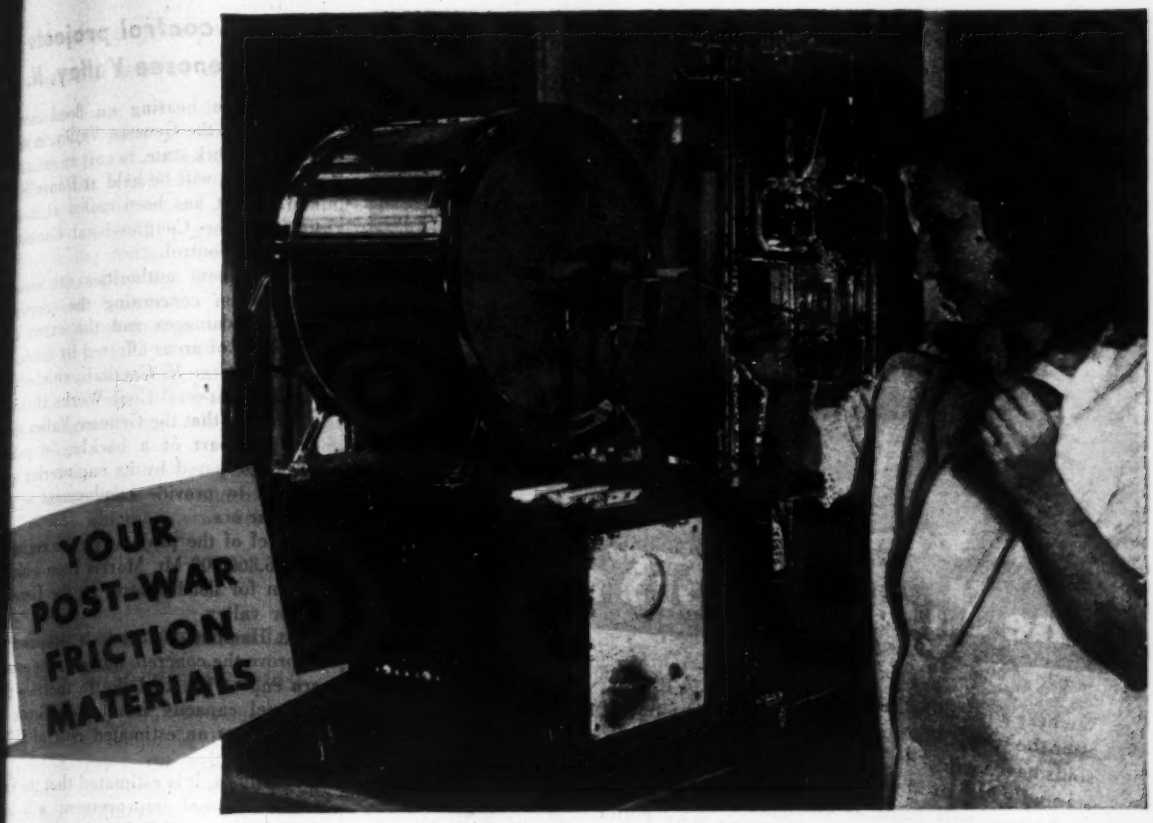
The committee is of the opinion that "action along these lines at the earliest possible moment will provide an opportunity to use the interval before VE-Day to retool and restock the construction industry, so as to enable it to get underway immediately in substantial volume when hostilities cease in Europe."

• • •

A 6-year street program for Milwaukee, Wis.

Plans for a 127-mile street paving program to cost $12,000,000 over a six-year period have been submitted to the examining committee of the board of estimates of Milwaukee, Wis., by R. W. Gamble, superintendent of street construction and repair.

The program calls for repaving of 63 miles of streets in the older sections of the city and 64 miles of construction in in newer areas. Such improvements would require a yearly appropriation of $1,000,000 by the city and special assessment levies to the same amount against abutting property.



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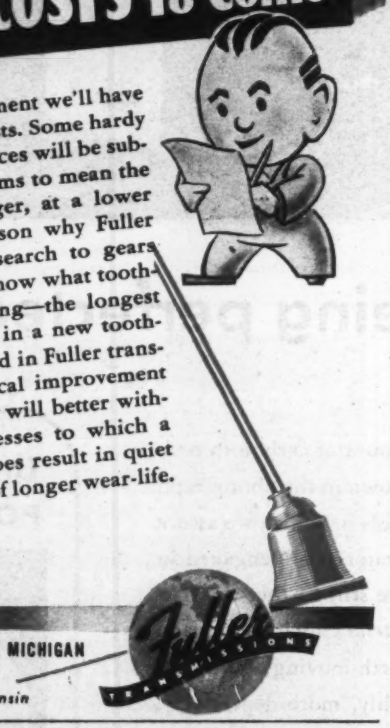
We hear a lot about the new equipment we'll have after the war . . . but little about costs. Some hardy souls have ventured a guess that prices will be substantially higher and to us this seems to mean the equipment will have to run longer, at a lower maintenance cost—that's one reason why Fuller engineers devoted exhaustive research to gears and gear-teeth. They wanted to know what tooth-shape gave the smoothest running—the longest wear-life. This research resulted in a new tooth-design which is now incorporated in Fuller transmissions. You'll find it a practical improvement because it does assure gears that will better withstand the shock loads and stresses to which a transmission is submitted—it does result in quiet running gears which are a sign of longer wear-life.



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Flood control projects for Genesee Valley, N. Y

A public hearing on flood control projects in the Genesee Valley, in western New York state, to cost an estimated $6,206,700, will be held at Dansville on Nov. 29. It has been called at the request of the Congressional Committee on Flood Control.

Government authorities are seeking information concerning the frequency of flood damages and the extent and character of areas affected by floods.

Col. George R. Goethals, chief of the Army Engineers' Civil Works Division, announces that the Genesee Valley projects are part of a backlog of public works prepared by its engineering specialists to provide employment in the postwar era.

Chief of the projects in the region is the $5,360,000 Mt. Morris Dam authorization for flood control in the Genesee River valley.

At Hammondsport, it is proposed to improve the concrete flume at the southern end of Keuka Lake to increase the channel capacity from Glen Brook to the lake at an estimated cost of $157,000.

At Ithaca, it is estimated that the Fall Creek channel improvement will cost $104,000, and $100,000 worth of work in the same creek at Watkins Glen is proposed at a cost of $100,000, while at Montour Falls, improvements of the Catherine and Haven Glen Creeks will cost $443,000.

Most of the projects are a part of the flood control program for central and southern New York expected to cost a total of $35,605,101. They were listed as 47 percent complete when halted by the war.

• • •

Dallas repairs sidewalks

Dallas, Tex., is carrying out a sidewalk repair and replacement program which does not require critical materials. All sidewalks in the city were surveyed and sections in need of preventive repair or replacement were listed. Property owners were then notified of the cost of repairs needed and given an opportunity to have the work done by city crews at cost or by private contractors in accordance with city specifications. About 50 percent of the owners acted on receipt of this first letter; remaining owners are sent a second notice stating that if repairs are not made within 30 days the city will do the work and assess the cost against the property. Owners who disregard this warning are called upon individually in a final effort to conclude the matter on a friendly basis.

Montana groups oppose federal water control

Labor, farm and business groups in Montana recently joined the Western Regional Council of State Governments in opposing centralized federal government control of water rights, including formation of the proposed Missouri River Valley Authority, at a conference in Helena sponsored by the Montana Taxpayers' Association.

Favoring continuance of state control over water rights in the west, one organization declared,

"The Bureau of Reclamation and Army engineers are able to handle all multiple use development of our rivers. River basin authorities would mean creation of other government agencies to do jobs which can very well be done by existing agencies."

Government seizes land for California housing

Anticipating a further housing shortage as the tempo of the war with Japan increases, the Federal Housing Authority has condemned 120 acres of land near Wilmington, Calif., on which 1,000 homes are to be built soon.

The order, which gives the government possession of the land under a leasehold until three years after the war, was signed by U. S. Judge Ralph E. Jenney.

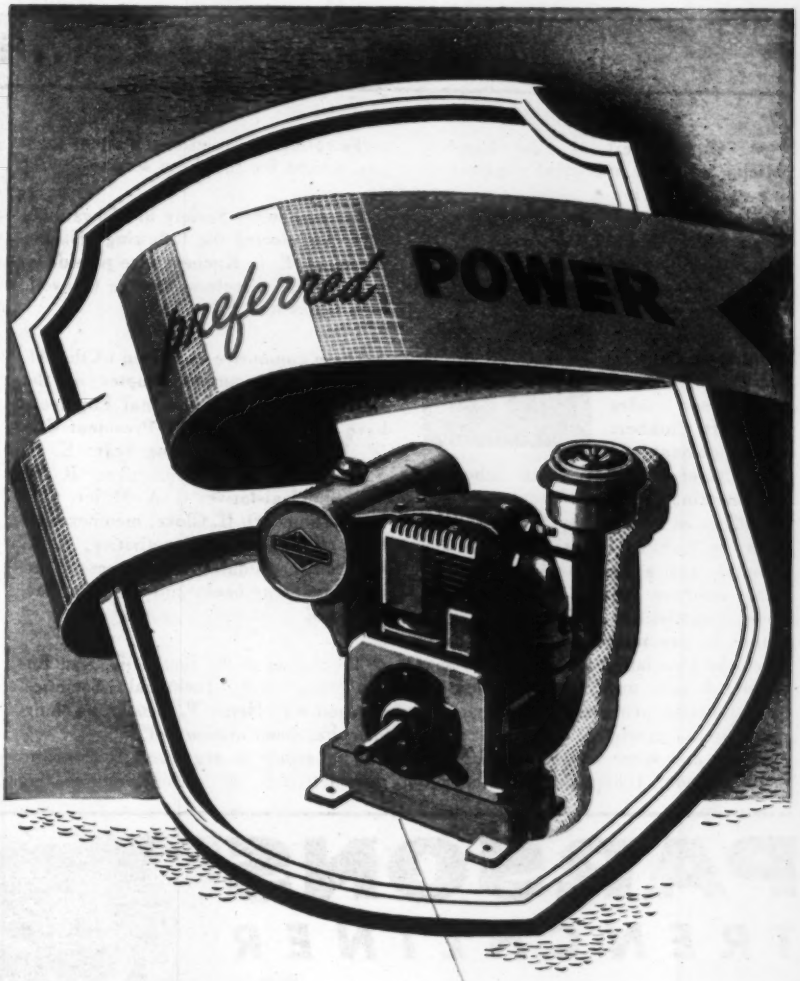
Robert M. Holcomb, head of the development division of the FHA, announced that a contract already has been let to the Westco Construction Co. to build the 1,000 dwellings at a cost of approximately $1,500,000.

The homes will be operated by the Los Angeles Housing Authority which also will supervise construction.

Construction is planned by petroleum industry

Deputy Petroleum Administrator Ralph K. Davies has addressed a letter to the War Production Board seeking approval of $352,944,385 worth of new construction of refinery facilities by the petroleum interests, as soon as materials become available. Expenditure would be divided about evenly between domestic and foreign projects.

Estimates are based on information received in response to a letter sent to all members of the refining industry in the United States. This letter requested "an outline of construction projects which it is desired to undertake as soon as possible on the basis of no governmental assistance other than priority."



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Elections and Activities

A. O. Cuthbert of East Lansing, Mich., has been appointed engineer-director of the County Road Association of Michigan. Until recently he was a member of the firm of Eddy & Cuthbert, Lansing construction equipment sales firm. Mr. Cuthbert is a graduate of the University of Michigan School of Engineering.

Offices of the County Road Association in Lansing were closed a few months ago after an opinion by the state attorney general declared county road commissions could not use their funds to pay membership dues. Since then the association's by-laws have been changed and, under Mr. Cuthbert, it will function primarily as a service organization, providing consultant engineering and other services for the road commissions. Under the attorney general's ruling, the road commissions may pay a fixed fee for these services.

The Engineers Society of Milwaukee, Wis., has elected the following officers: president, E. L. Knebes; vice president, J. A. Potts; directors, George Crowell, Sam Gates and P. G. Ellis.

These committee chairmen of the Albany, N. Y., county chapter of the state Society of Professional Engineers have been appointed by President Guy W. Pinck for the coming year: E. H. Sargent, ethics and practice; R. C. Wheeler, legislative; C. A. Miller, public relations; D. H. Cloke, membership; G. C. George, special activities; E. K. Karcher, candidates for licenses; C. A. Peterson, year book, and J. L. Harvey, historian.

Formation of the Louisville, Ky., Engineering and Technical Societies' Council with Henry V. Heuser, as chairman has been announced.

The group is organized to coordinate activities of various engineering groups and "to render service to the community of a technical nature." Other officers named were L. E. Pennington, Reynolds Metal Co., vice chairman; Charles H. Peters, E. F. Houghton Co., secretary; and Dr. Otto Mileti, Charles R. Long, Jr., Co., treasurer. The group plans to publish a bimonthly journal.

The Engineers Society of Milwaukee, Wis., has purchased a large home upon which they intend to spend $100,000 in remodeling after the war.

Allen Mulford, engineering and commercial head on lend-lease and foreign government orders of International General Electric Co., told members of the Fort Wayne, Ind., Engineers' Club, at a recent meeting, that engineers planning to go abroad after the war should not consider such jobs as temporary, since devastated Europe will offer from 15 to 20 years of work for engineers.

C. H. McAllister of the Tide Water Power Co. has been nominated for

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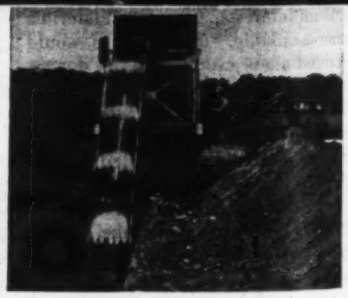

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As you know, when the war started, plants like ours were placed pretty far down on the list of non-essential industries. Finding workers and getting materials for proper maintenance has been, and still is, a tough problem.

Under these conditions, we have been greatly pleased with the efficient performance of our Jenkins Valves. They have consistently exceeded our expectations, and have helped us materially to keep our plant operating at full capacity. When more valves are required, they'll be Jenkins, for sure!

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George Wasil

George Wasil, Plant Engineer

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or the past three years, linen supply houses and dries have been among the "orphans" of the war omy, getting only what was left in man power and pment.

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Every Carver Pump carries a "Certified" tag which means that it has been carefully tested and fully meets our high standards for performance on the job. It's your assurance of peak performance on your toughest jobs as well as on the easy ones. For details, see your nearby Carver distributor or write direct.

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president of the Wilmington, N. C Engineers Club. T. R. Cobb of the U. S Engineer Office was nominated for vice president and H. E. Hicks, also of the U. S. Engineer Office, for secretary and treasurer. Nominated for the board of directors were: G. G. Thomas, of the Atlantic Coast Line Railway Co., and J. B. Lasley of the North Carolina Shipbuilding Co.

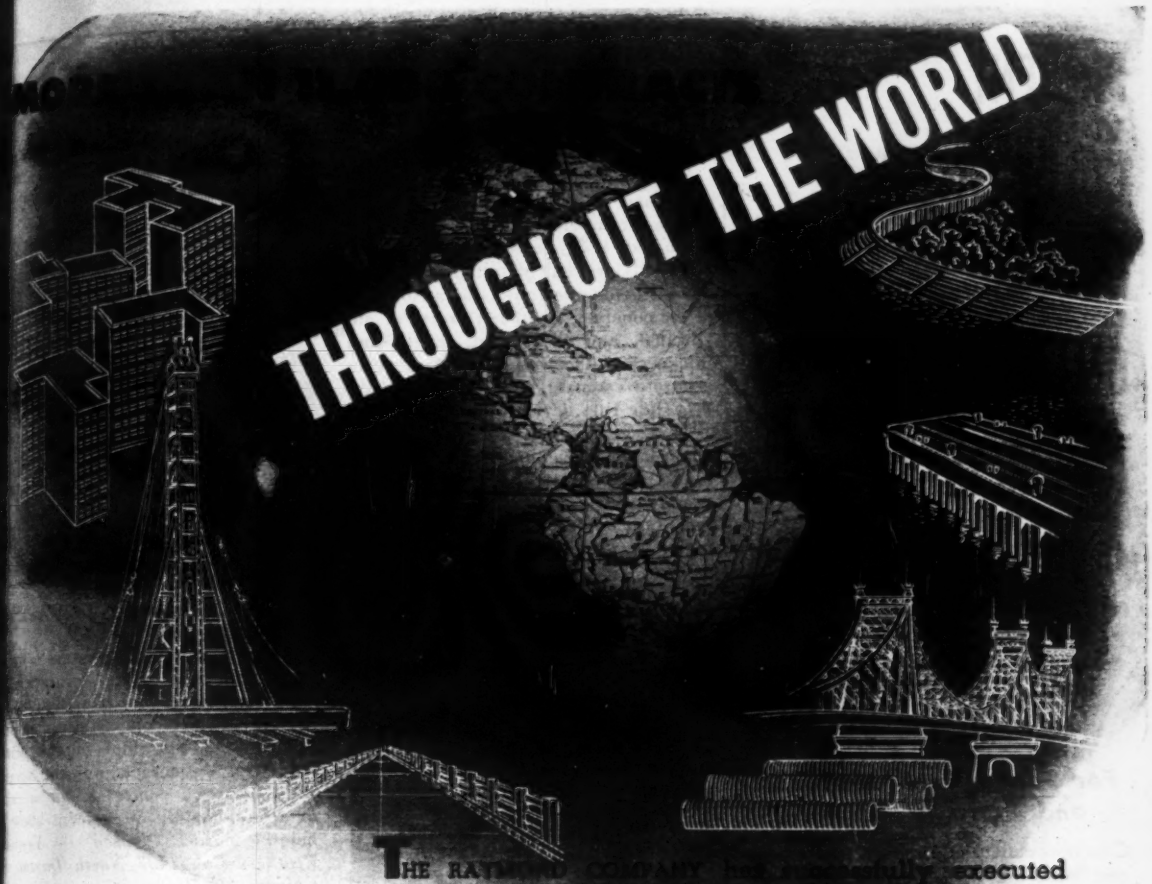
Howard Mansur has been named president of the newly organized construction council at Spokane, Wash. Other officers are Clyde Ludberg, vice president, and Art Bittrick, treasurer. All large construction firms of the Spokane area are represented in the council.

Edwin Elliot is the new president of the Philadelphia Engineers Club for 1944-45. Other officers, Robert V. Hudson, vice president; R. Victor Westermaier, vice president; Philip H. Chase, vice president; Henry S. Harris, secretary; Herbert B. Allen, treasurer. Directors are: J. P. Harbeson, Jr.; Lyle L. Jenne; T. G. Alteneder; Andrew C. Muir; V. L. Sanderson; Lewis B. Beatty; R. M. Fuller; George W. Bower; H. H. Mather; Major J. S. Benn, C. E.; H. W. Pierce.

The Kansas Association of Municipal Utilities and the Kansas Association of Utilities Manufacturers and Suppliers recently held their annual meeting jointly at Emporia. James D. Donovan, superintendent production and distribution of the Kansas City, Kan., municipal water and light plant, was elected president of the former and A. Cooley Hollowell, district manager, Kansas City branch of the Badger Meter Mfg. Co., was elected president of the latter organization.

F. Malcolm Farmer, vice president and consulting engineer of the Electrical Testing Laboratories, New York, has been re-elected president of United Engineering Trustees, Inc., the joint agency of the four national societies of civil, mining and metallurgical, mechanical, and electrical engineers.

Other officers elected: S. Tuttle, consulting engineer, vice president, Everett S. Lee, engineer in charge, General Engineering Laboratory, General Electric Co., vice president; George L. Knight, chairman of the finance committee; A. L. Queneau, chairman of the real estate committee, Albert Roberts, treasurer, C. R. Jones, assistant treasurer, John H. R. Arms, general manager of the corporation, continues as secretary.



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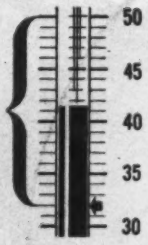

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The amount and size of plywood, studs and wales needed for any given plywood concrete form may be quickly estimated, it is claimed, with the new Keely Plyform calculator. Any engineer or contractor who knows the rate of pour of the concrete, whether vibrated or unvibrated, and the height, length and thickness of the wall, can arrive at an accurate estimate with one setting of this slide rule device.

This calculator is also said to save much labor in looking up formulas and in figuring.—Designed by *Hal Keely, president, National Plywood Distributors Association, Inc., 111 West Washington St., Chicago 2, Ill.*

• • •

Heating Torch

Lighter in weight than former heating torches, a new Style 9802 torch is said to have equal gas capacity. This implement, designed for concentrated localized heating to bend, straighten or

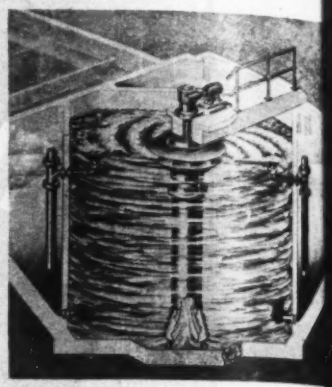
shrink steel plate, as well as for silver-brazing heavy copper plate for pipe, has five multi-flame acetylene heating tips and two multi-flame propane tips.

The torch has three mixers, for positive pressure and low pressure acetylene, and for propane. A 12-in. straight extension, and 18, 24 and 42-in. angular extensions are available.—*Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.*

• • •

Sludge Aerator and Clarifier

Mechanical aeration and final clarification in the activated sludge process are provided within a single concrete structure in a new "Aerifier." Because of automatic sludge return, it is n necessary to design the aeration ta for the usual 25 percent addition



capacity, thus saving in power a construction cost.

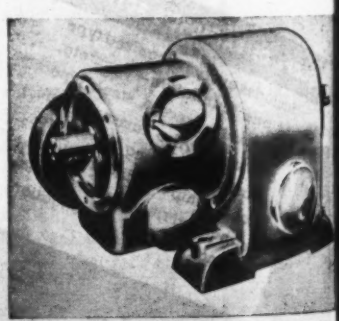
Extra long weir lengths are fully a cessible in this device, insuring mi mum surface velocity in settling tank its four clarifier compartments functi in unison. "Spiralflo" aerator drive offered as optional equipment, provi variable speed control within a ran of approximately 30 percent above below normal speed. — *Yeoma Brothers Co., 1433 North Dayton S Chicago 22, Ill.*

• • •

Variable Speed Drive

Revolutionizing the theory of co trolled power transmission, the ne Lombard variable speed drive consis of simple gearing to transmit the powe and a light V-belt to vary the spee ratio, an arrangement which is said t be positive and highly efficient. Thes features, coupled with its low weigh and small size, make the drive of pa ticular importance in the medium an higher horsepower fields, it is claime

Space requirements are reduced b cause of the compact design of the uni



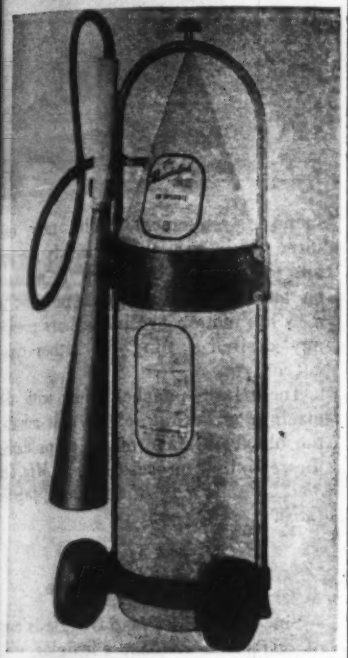
which assures positive drive in spite o its low weight and small size. It

available in a wide range of sizes and speed ratios. While the drive is normally furnished with a manual control hand wheel or lever, it may also be had with remote control.—*Lombard Governor Corp., Ashland, Mass.*

• • •

Fire Extinguisher

Mobility and ease of operation are found in a new wheel-type carbon dioxide fire extinguisher, weighing 25 lb., which is moved and operated with single-sweep action. This device has an



exclusive palm-trigger valve, which discharges the carbon dioxide 10 to 20 ft. in a large arc. Release of pressure on the trigger automatically stops the flow of gas.

The extinguisher has a 5¾-ft. horn-and-hose connection, which enables the operator to keep a safe distance from the fire. Mounted on hard rubber wheels, the unit is self-balanced.—*Randolph Laboratories, 8 East Kinzie St., Chicago, Ill.*

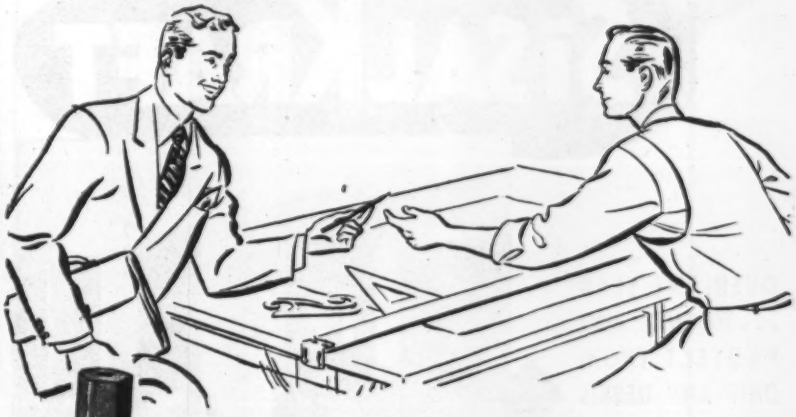
• • •

Waterproof Pipe Conduit

All traces of moisture are kept out of the newly modified Therm-O-Tile conduit used in wet or submerged locations, the manufacturer states. Standard design conduit is hermetically sealed by a waterproof membrane and then is placed on top of a wide sub-base which is beneath the standard spread-footing foundation.

The waterproof membrane usually consists of 15-lb. asphalt-saturated felts, laid in hot asphalt and finished with a top mopping of hot asphalt. A drain

IF YOU THINK IT'S ONLY SALES TALK...



Try an Eldorado pencil at your drafting board! The proof is in the using—and an Eldorado gives you superlative proof of

uniform, accurate grading
smooth responsiveness
strength under pressure
flawless, opaque lines

If you are not using an Eldorado—make the acquaintance of America's finest drawing pencil. Send for a Comparison Sample by filling out and mailing the coupon below.

With the pencil, we'll also send a complimentary copy of "I Shall Arise"—a portfolio of Typhonite Eldorado pencil reproductions by Samuel Chamberlain. The subjects are buildings of artistic and historical importance bombed by the Nazi Luftwaffe early in the war. The portfolio is most appropriate at this time as a magnificent memento of the culture and the courage of the countries now rising again as the Allied Nations liberate them, one by one.

TYPHONITE
ELDORADO

Pencil Sales Department 227-J 11
JOSEPH DIXON CRUCIBLE CO., JERSEY CITY 3, N. J.

Gentlemen:
Please send me a Comparison Sample of Typhonite Eldorado drawing pencil in .... degree. Also the Portfolio of drawings, "I Shall Arise".

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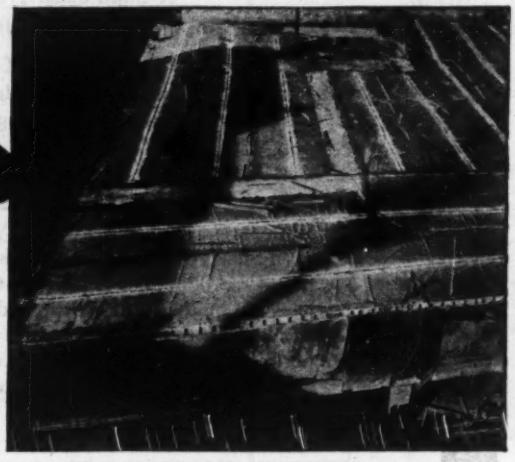
When You're Pouring Concrete, Use . . .

SISALKRAFT

OVER THE SLAB . . . TO CURE AND PROTECT FROM DRIP AND DEBRIS

Waterproof, tear-resistant, scuff-proof SISALKRAFT retards evaporation and protects the concrete from dirt, dripping grout and debris.



ALL AROUND THE JOB FOR PROTECTION FROM FROST

Used all around the building, SISALKRAFT holds in the heat from salamanders or other heating units. On the large building job illustrated, the SISALKRAFT blankets are all in place, despite a gale that lasted 24 hrs.

For nearly 25 years the unmatched performance of SISALKRAFT has made it the Number One concrete curing and protecting agent. Use it when you're pouring concrete — for buildings, runways and roads.

THE SISALKRAFT CO. 205 W WACKER DRIVE · CHICAGO 6, ILL. NEW YORK SAN FRANCISCO LONDON SYDNEY

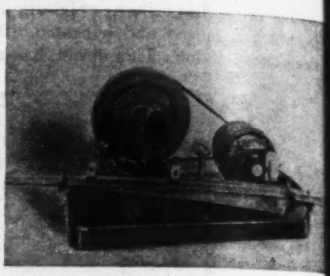
Manufacturers of SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

channel is provided to drain off moisture, if condensation occurs within the conduit.—*H. W. Porter & Co., 825 Frelinghuysen Ave., Newark, N. J.*

• • •

Handsaw Retoother

A perfect set of new teeth can be punched in an old handsaw in less than one minute with the new Burro automatic retoother, according to the manufacturer's statement. The new, uniform teeth can then quickly be set and filed. The retoother is mounted on an 11x24-in. base and powered by a ¼ hp. motor; five index bars provide any desired cutting for either cross-cut or rip.



Teeth are punched out with this machine at the rate of 240 per minute; the old teeth come off as chips during the retoothing process.—*Burr Mfg. Co., 3392 Robertson Blvd., Los Angeles, Calif.*

• • •

One-Piece Goggle

Since the new Plasti-Goggle is made of one piece of clear Plexiglas, which has the same qualities as the finest optical glass, it may be worn all day without eyestrain or fatigue, the manufacturer states. The lens area extends in an unbroken curve from temple to temple, without corners or sharp bends; no rivets, bars or seams are necessary, so vision is unrestricted.

The goggle is said to be impact- and spatter-resistant, and comfortable because of its ¾-in elastic headband, lightweight and smooth edges.—*Eastern Equipment Co., Inc., Willow Grove, Pa.*

• • •

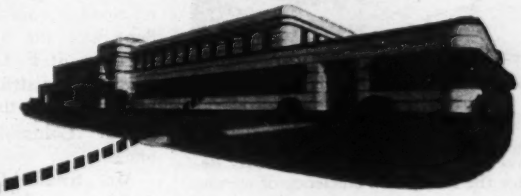
Masonry Paint

Developed to protect masonry surfaces from effects of weather, a new ready-mixed exterior paint, Mason-Bond, also resists lime and alkali, it is claimed. It may be applied over damp or dry masonry. If a special substance, Fungus-Ban, is added, spore or fungus attack is combated.

This paint is said to adhere excellently to smooth or rough surfaces.—*The Wilbur & Williams Co., Park Square Bldg., Boston, Mass.*

CROSS THE VOLTURNO

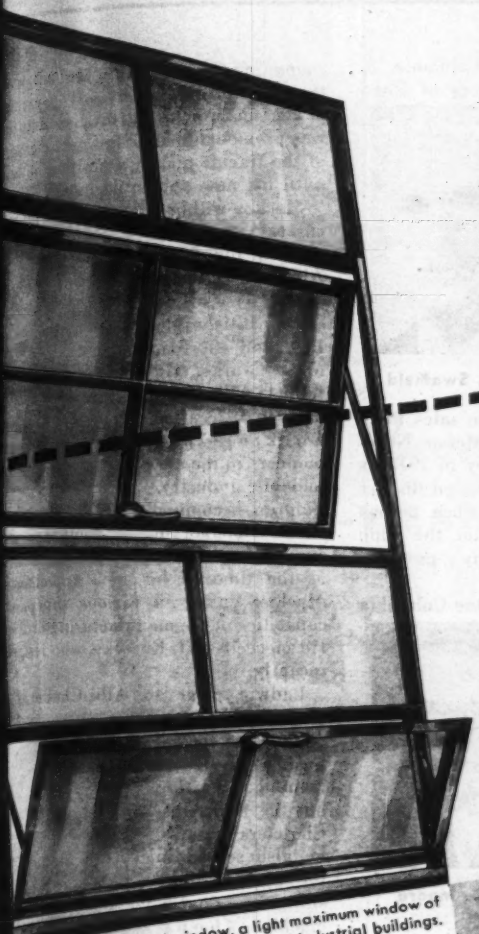
The Engineering skill, that produces the CECO STEEL WINDOW ...now makes possible the Bailey Bridge... spanning enemy streams on all fronts.



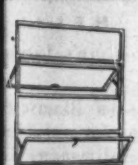
A "bridge of windows"? Yes, in a sense . . . for into the Bailey Portable Panel Bridge have gone all the skill and "know how" we have acquired in manufacturing the Ceco precision-engineered Steel Window.

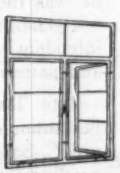
A remarkable engineering feat . . . this bridge that can be assembled like a giant erector set . . . by a surprisingly small group of men . . . to reach gaps up to 200 feet in only a few hours. It is rolled out in 10 foot sections from one bank of a stream and because of the perfect (no tolerance) fit of the sections, will support terrific loads.

The Ceco Steel Window, like the Bailey Panel Bridge, is precision built and durable. For Ceco engineers build "small" with the same precision they build "big". This skill and exactness gives the Ceco window important lasting advantages in installation and operation. They assure longer life and greater beauty. For commercial, school, factory, or hospital builder, Ceco construction products and Ceco Steel Windows do a better job through precision engineering.



Ceco Commercial projected window, a light maximum window of proven adaptability for all commercial and industrial buildings.





Ceco line of Steel Windows includes Light and Intermediate Basements, Basement Windows, Architectural Projected, Commercial Projected and Pivoted Windows, Continuous Windows, Factory and Utility Windows, Mechanical Operators, etc.

OTHER CECO ENGINEERED PRODUCTS:
Ceco Steel Doors, Metal Frame Screens, Metal Lath, Weatherstrips, Steel Joists, Steel Roof Deck, Meyer Forms, Adjustable Shores and Clamps, Concrete Reinforcing Bars and Welded Fabric.

STEEL PRODUCTS CORPORATION
General Offices: Omaha, Nebraska
Manufacturing Division: 5701 W. 26th St., Chicago, Ill.

What the CECO engineered window means to Architect, Constructor and Factory Worker

1. Precision Engineering means an extra tight all weather seal—keeps out cold, dust, rain—keeps heat in.
2. Precision Engineering means easy opening, and closing—no sticking, warping, or swelling. Ceco Windows always fit.
3. Precision Engineering means a far greater light area, lets more sunlight in, easier to see out.
4. Precision Engineering means controlled ventilation—you'll always catch stray breezes—control draughts.
5. Precision Engineering means permanence—Ceco Steel Windows use more steel, last the lifetime of your factory.
6. Precision Engineering means Bonderizing, a special process for sure protection against paint failure and rusting.
7. Precision Engineering means all these important advantages at no premium cost!

ES THE BIG DIFFERENCE IN CECO CONSTRUCTION PRODUCTS

A prominent aviation manufacturer used a Laughlin Safety Hook, as shown, as part of a riveting machine set-up purposely devised for the safety and efficiency of women war workers.

This hook's unique, stout-springed safety latch holds its burden securely despite strain or jolts. That's why workers like it — it's safer.

This latch is available on all sizes and styles of Laughlin hoist hooks.

LAUGHLIN THIMBLES: Two styles . . . regular and plow steel pattern (extra heavy for use with plow steel and high tensile wire ropes).

LAUGHLIN SWIVELS: Made in the following types: jaw and jaw, chain swivel, swivel with jaw end, swivel with swivel. Drop-forged.

Write for catalog showing the complete line of Laughlin Wire Rope Fittings

Distributed through Mill, Mine and Oil Field Supply Houses

Look for Laughlin Products in Power's Road & Street Catalog

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN *Company*
PORTLAND 6, MAINE

Manufacturers' Activities

CONSOLIDATION of the Columbia, S. C., and Atlanta, Ga., offices of Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co. has been announced, coincident with the retirement of F. G. Swaffield, district manager of the firm's Columbia office.

F. G. Swaffield

Mr. Swaffield's retirement ends his 40-year career with the sales force of Pittsburgh Equitable-Merco Nordstrom. Joining the company in 1940 as a salesman and later appointed district manager of the Columbia office, he has been largely responsible for the wide current use of the company's products in the Columbia territory.

In assuming control of the Columbia office territory, C. C. Moore, manager of the Atlanta district office, now directs field sales in Florida, Georgia, Alabama, Mississippi, Tennessee, North Carolina, South Carolina, Virginia and most of Kentucky.

C. C. Moore

THE FOLLOWING new managers in the manufacturing division of the Allis-Chalmers Manufacturing Co. were announcer recently. Hugo W. Liebert, general works manager of the tractor plants, Fred S. Mackey, general works manager of the general machinery plants, and Harry E. Ladwig, works manager of the West Allis foundries and pattern shops.

H. W. Liebert

Liebert whose appointment was mentioned briefly in our Oct. 5 issue, will be in charge of manufacturing in the tractor and farm machinery works at West Allis and La Crosse, Wis., Springfield, Ill., La Porte, Ind., and Oxnard, Calif. He came to Allis-Chalmers in 1903. Prior to that, he had worked in several shops in Chicago, Ill. He advanced through various supervisory capacities in the manufacturing division until he was promoted in 1942 to works manager of the tractor plants, a position he held until his new appointment.

Mackey will be charge of general machinery manufacture at the West Allis, Supercharger, Norwood, Ohio, Pittsburgh, Pa., and Boston, Mass., works. He joined Allis-Chalmers in 1923 after working with pioneers in the automobile industry. Before becoming works manager of the company's new supercharger plants the position he held at the time of his new appointment, Mackey served in various supervisory capacities in the manufacturing division. He succeeds J. J. Rosecky, who resigned recently.

F. S. Mackey

Ladwig came to Allis-Chalmers in March, 1909, after completing special business school training. Starting out in the Allis-Chalmers foundry, he also served in the pattern shop, shipping room, machine shops, and office. Before his appointment, he was the assistant general superintendent of this concern's foundries and pattern shop.

H. E. Ladwig

THE TIMKEN ROLLER BEARING Co. has announced the appointment of Howard C. Sauer as general manager of its newly-created foreign division, which will handle the sales and service of bearings, steel, and detachable rock bits in the world market outside the U.S. The division's offices will be in Canton, Ohio. Mr. Sauer was chief of the antifriction bearing section of the tools division of the War Production Board from Sept. 1941 to Sept. 1944.

THE WHITING STOKER Co., Whiting, Ind., has been acquired by the Lingerwood Manufacturing Co., Elizabeth, N. J., makers of heavy construction supplies, marine auxiliary machinery and heavy mining machinery. Headoffices will be continued in Chicago. The

HIGH EARLY STRENGTH
WITH
BUILT-IN CURING

Insure Your
COLD-WEATHER CONCRETING

The simplest and most economical way to get full strength into cold weather concrete is with standard portland cement and calcium chloride in the mix.

Full strength depends upon adequate curing. With calcium chloride, curing is "built-in." Long series of tests over many years have shown that calcium chloride accelerates cement hydration and produces greater strength in concrete at all ages.

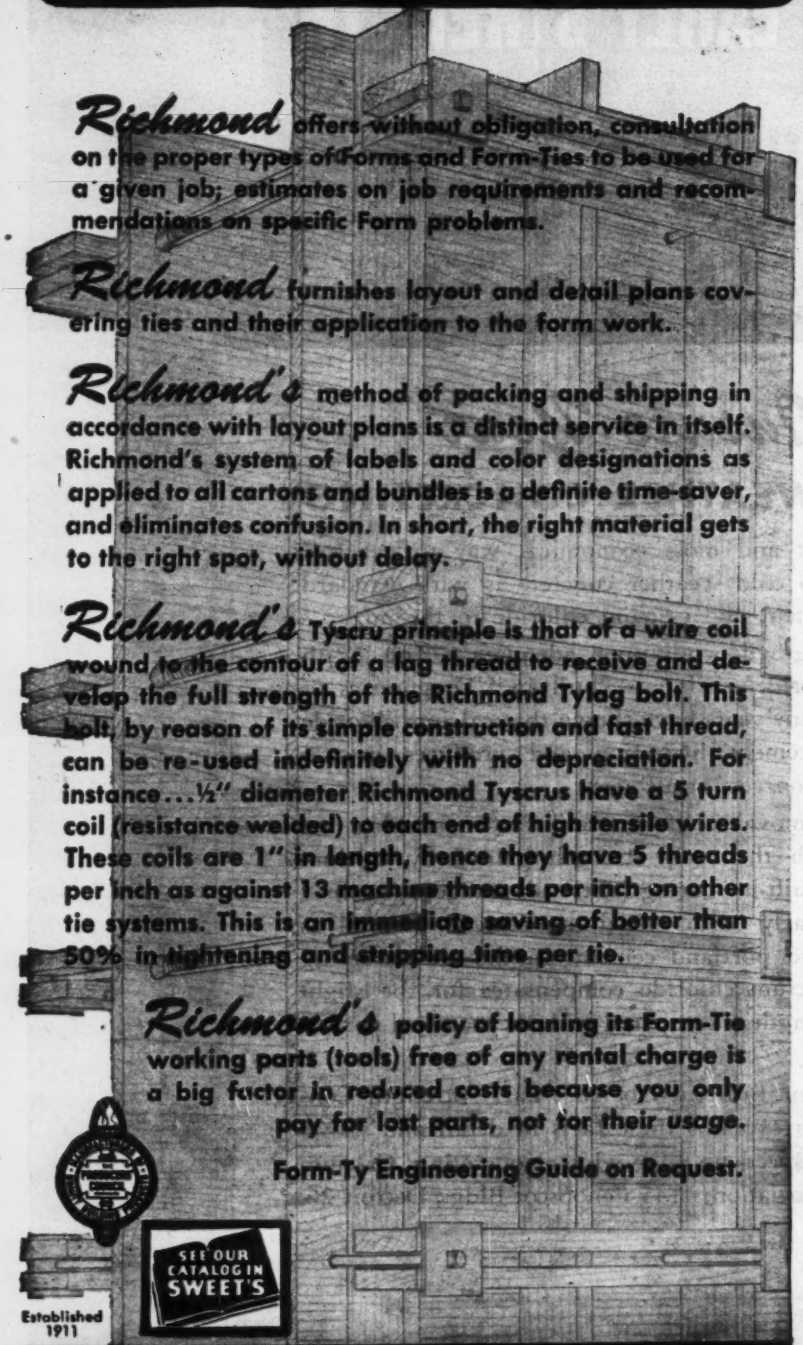
Earlier removal of forms and faster finishing are attained with the early strength gained by calcium chloride's "built-in" curing. These advantages are gained with high early or air-entraining cements as well as with standard portland cement. In the air-entraining cements, calcium chloride compensates for the slight losses in strength as compared with the standard normal cements.

Ask for our Bulletin No. 28, "Early Strength Concrete," which explains these facts in detail and shows you how to speed up your winter concreting. Calcium Chloride Association, 4145 Penobscot Bldg., Detroit 26, Michigan.

FOR YEAR-'ROUND CONCRETING

USE CALCIUM CHLORIDE IN-THE-MIX

PLANNED FORM WORK
SPEEDS CONCRETE CONSTRUCTION



Richmond offers without obligation, consultation on the proper types of Forms and Form-Ties to be used for a given job; estimates on job requirements and recommendations on specific Form problems.

Richmond furnishes layout and detail plans covering ties and their application to the form work.

Richmond's method of packing and shipping in accordance with layout plans is a distinct service in itself. Richmond's system of labels and color designations as applied to all cartons and bundles is a definite time-saver, and eliminates confusion. In short, the right material gets to the right spot, without delay.

Richmond's Tyscru principle is that of a wire coil wound to the contour of a lag thread to receive and develop the full strength of the Richmond Tylag bolt. This bolt, by reason of its simple construction and fast thread, can be re-used indefinitely with no depreciation. For instance...½" diameter Richmond Tyscrus have a 5 turn coil (resistance welded) to each end of high tensile wires. These coils are 1" in length, hence they have 5 threads per inch as against 13 machine threads per inch on other tie systems. This is an immediate saving of better than 50% in tightening and stripping time per tie.

Richmond's policy of loaning its Form-Tie working parts (tools) free of any rental charge is a big factor in reduced costs because you only pay for lost parts, not for their usage.

Form-Ty Engineering Guide on Request.

SEE OUR CATALOG IN SWEET'S

Established 1911

RICHMOND SCREW ANCHOR COMPANY, INC.

545 LIBERTY AVENUE · BROOKLYN, NEW YORK

Whiting Co. will be operated as an affiliate of the Lingerwood Corp.

OFFICIALS and department heads of the S. M. Jones Co., Toledo, Ohio, recently paid tribute to Louis Stritmatter, assistant chief engineer, who has been with the company 50 years. Mr. Stritmatter began working for the company, then known as the Acme Sucker Rod Co., July 6, 1894. A son, Frank H. Stritmatter, has been with the company's engineering department 25 years.

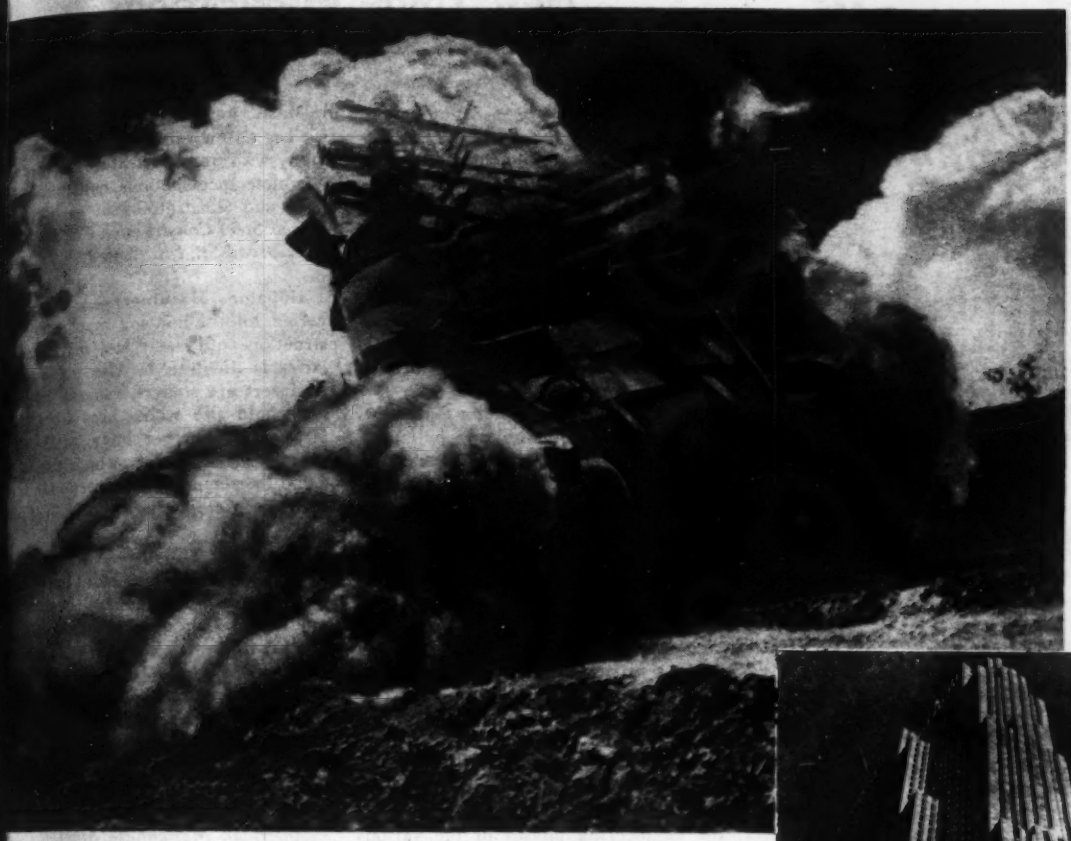
HERBERT B. LEWIS has joined Lukenweld Steel Co., and divisions, By-Products Steel Corp. and Lukenwald, Inc., Coatesville, Pa., as manager of the machinery division.

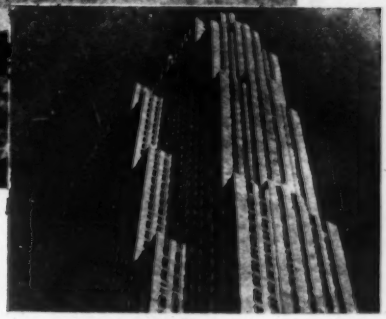
Mr. Lewis attended the Rensselaer Polytechnic Institute, Troy, N. Y. Upon his return from overseas at the end of the last war, he joined Brown & Sharpe Manufacturing Co., Providence, R. I., where he has remained for the past 25 years. He developed many instruments and methods in connection with high precision manufacture of gages, small tools, cutters and machines. He organized and for several years was in charge of the experimental department. There tests on raw materials and company products, as well as tests and development of designs, processes and equipment, were conducted.

RECENTLY the cornerstone was laid for an office building of the R. G. LeTourneau Co. at Vicksburg, Miss. A religious ceremony took place at the dedication, in accordance with the belief and practice of Mr. LeTourneau, all of whose plants have been so dedicated. He is a preacher as well as a manufacturer.

THE JAEGER-LEMBO MACHINE CORP. of Corona, N. Y., has announced the recent purchase of a building and property consisting of 25,000 sq.ft. at the corner of 127th St. and Northern Blvd., Corona. Joseph C. Lembo, president, says this is necessary because of the acquisition of new lines to sell immediately after the war. The building is a modern brick and concrete fireproof structure. The showroom covers 8,000 sq.ft., and the remainder of the building will be used for parts and service, repair shops, etc. The company exclusively represents the Jaeger Machine Co. of Columbus, Ohio, in the New York and New Jersey area, and also represents ten other manufacturers.

"Making strong the things that make America strong





Supporting a Tank's Attacks . . . Defending a Building's Joints

ROARING GUNS . . . its quick starts
d sudden stops . . . its steep climbs
d thudding drops . . . all combine to
ve a tank a beating no other vehicle is
ked to take. Its bolts and nuts must be
ade of rugged stuff . . . tough metal,
rong heads, sturdy threads . . . sub-
cted to scrupulous inspection.

A building doesn't show the violent
rains it undergoes . . . yet its joints are
ways in a state of tension. Here, bolts
d nuts must have better-than-average
eld strength . . . with accurate di-
ensions and clean threads for quick
t-away and speedy run-on.

Maximum resistance to every strain
ur equipment or construction must stand . . . top assembly speed that guards against slow construction and mounting costs: these are built into every RB&W fastener.

For 99 years, constantly improved strength, accuracy and finish of RB&W products have resulted from continuous research and progress. Starting with RB&W's development of the first automatic cold-header, this progress has been sustained by great investments in the most modern manufacturing equipment and most up-to-the-minute methods for quality control from raw material to finished fasteners.

RB&W's proved ability to put the ideal combination of strength, accuracy and finish into fasteners explains why the RB&W EMPIRE brand is so generally specified in the best farm implements, automobiles and aircraft; by railroad and construction engineers; in power and transmission equipment; and by general industry . . . and why RB&W products can help you make *your* products stronger and faster.

RB&W

Russell, Burdsall & Ward Bolt and Nut Company. *Factories at:* Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. *Sales offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

APS PLASTEEL ROOFING

1 ALL THE ADVANTAGES OF STEEL

Light, strong, rigid, easily handled.

2 PLUS WEATHER-TESTED COMPOUND

Resist extremes of weather, moisture, acid fumes, salt-air corrosion, etc.

3 PLUS EXTERIOR MICA COAT

Ornaments and adds protection. Attractive silver-gray finish needs no upkeep, no painting!

All these advantages — and more — are yours if you use APS PLASTEEL Roofing and Siding. Available for immediate shipments in standard corrugations for industrial as well as farm use.

PROTECTED STEEL PRODUCTS

General Office and Plant,
WASHINGTON, PA.

New Trade Publications

Paints and Varnishes—A new catalog of products for the building industry features acoustic cement, aluminum paints, aluminum waterproofing, anti-rust coatings, caulking compounds, cement floor paints, cork cement, dryers, enamels, enamel undercoats, glazing putties, heat-proof aluminum, ready mixed house paints, varnishes, washable flatwall paints, and wood floor paint.—*Dolphin Paint and Varnish Co., 921 Champlain Street, Toledo 3, Ohio.*

Ball Bearings—A bulletin that shows a complete line of miniature ball bearings for instrument, industrial and special uses. Information is given on radial type bearings from ⅛ in. to ⅞ in. O.D. and pivot type from 2 to 10mm. Conveniently tabulated are dimensions and full specifications including load ratings for each bearing. The bulletin is accompanied by a survey sheet for obtaining free engineering recommendation on any bearing application.—*Miniature Precision Bearings, Keene, N. H.*

Heating and Air-Conditioning—Engineers and architects are offered a new guide of a control system for home heating and air conditioning, dealing with the engineering phases of the various methods.—*Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.*

Lathes—This catalog describes engine, toolroom and precision turret lathes, with complete specifications covering capacities, speeds, feeds, and dimensions.—*South Bend Lathe Works, South Bend 22, Ind.*

Cutting Tools—A 12-page adjustable cutting tool catalog is printed in two colors and illustrated with diagrams and photos of actual operations. The principle of adjustability applied to cutting tools is explained.—*Robert H. Clarks Co., 9330 Santa Monica Blvd., Beverly Hills, Calif.*

Productive Coloration—A system of utilizing color and the reflective quality of paints to help increase efficiency, output and safety in industrial plants is described and illustrated in a full-color brochure.—*Building Products Division, L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.*

Revolving Field Generator—A new folder is available describing a revolving field generator.—*Kato Engineering Co., Mankato, Minn.*

Masts and Towers—A catalog describes a new line of masts and towers many with unusual features. There are complete specifications, construction details and illustrations of each type.—*Harco Steel Construction Co., Inc., 118 East Broad St., Elizabeth 4, N. J.*

Hoisting Machinery—A large and varied line of hoisting machinery, construction equipment and marine auxiliaries is illustrated. Also presented in an insert are stokers, ranging from the household size which uses from 15 to 50 lbs. of coal per hour, to the compression feed models which use up to 2,200 lb. per hour.—*Lidgerwood Manufacturing Company, Elizabeth, N. J.*

Dredgers' Bulletin—A 56-page catalog tells about the important part played by austenitic managanese steel in the operation of dredges of all types. The 50-year history of placer dredging is colorfully told by Corey C. Brayton, west coast engineer. Another section deals with dipper dredges and the problems encountered in subaqueous excavations with equipment of this type. Illustrations are of various types of dipper buckets, bails, stick racks, pinions, etc.—*American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill.*

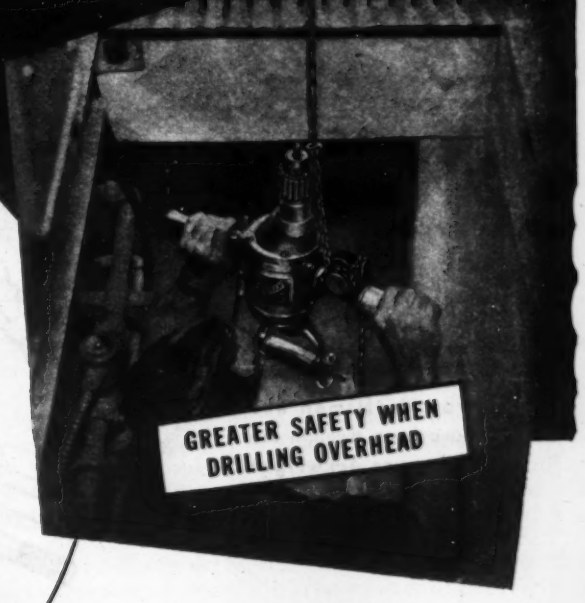
Contractors Public Relations—A 24-page manual on the building of public good will has been published by the Associated General Contractors of America as part of its public relations program.

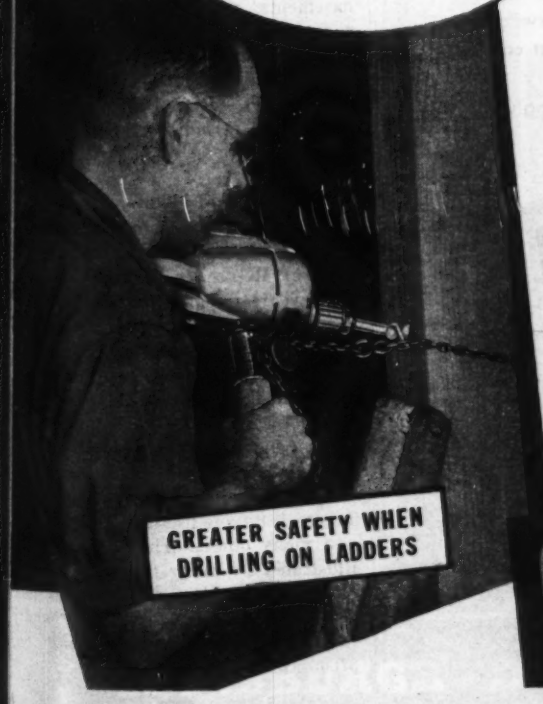
Printed in three colors and illustrated with sketches, the booklet contains a public relations chart, sample advertisements, and project signs and posters for the use of contractors. Numerous examples are given on how public good will can be merited, attained and kept.—*Associated General Contractors of America, Inc., 10 Rockefeller Plaza, New York 20, N. Y.*

Machinery Service—Repair and parts service for more than a score of manufacturers of construction equipment is described in this 36-page illustrated booklet.—*H. O. Penn Machinery Co., Inc., New York, N. Y.*

Preformed Wire Rope—This literature points out many advantages of preformed wire rope, among the claims being these: Longer life; easier to handle; does not ravel; broken wires lie

MAKE ANY DRILLING JOB in any position EASIER with this *Pressure Handle* on a SKILSAW DRILL!





● Now you can drill with *extra ease* and *extra safety* in any position . . . head-high, overhead or on ladders . . . by simply attaching this Pressure Handle to your SKILSAW DRILL *or any make of drill.* Pressure Handle gives the operator complete control of drilling pressure at all times . . . eliminates twist drill breakage . . . saves the time of an extra man with ropes or chains to hold the drill.

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flat; more flexible; does not kink; does not twist or spin; easier to splice; spools better on the drum.—*Preformed Wire Rope Information Bureau, 520 N. Michigan Ave., Chicago 11, Ill.*

Conduit Systems—In addition to comprehensive descriptions of the manufacturer's products, this 12-page booklet contains a great deal of information for engineers, architects and heating contractors concerned with the problem of insulation and protection of piping—either underground or overhead. Capacity tables, trench dimensions and general specifications are included for prefabricated insulated pipe units and for tile or cast iron conduit systems.—*The Ric-wiL Co., 1572 Union Commerce Building, Cleveland, Ohio.*

Bit Dressers—A new 24-page bulletin describing blast hole drill bit dressers has been issued. Fully illustrated with photographs, explanatory drawings, and diagrams of efficient shop layouts, this attractive 2-color booklet tells how the driller can get faster dressing for his bits with less waste of steel, and with fewer sharpenings. One of the particular advantages of the bit dresser is its accurate shaping, and the uniformity of its production regardless of the operator's skill.—*Bucyrus-Erie Co., So. Milwaukee, Wis.*

Pneumatic Sponge Pumps—A new bulletin covers the pneumatic sponge pump designed for pumping heads up to 150 ft., in single stage, and 300 ft. in two stages, and applicable for use in mine shafts and winzes, cofferdams, caissons, sumps, cisterns, pits, tanks, basements, manholes and bilges; on construction projects for salvage work, or other similar applications where the pumped fluid contains a heavy percentage of solids.—*Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles, Calif.*

The Fatigue of Metals—The result of many month's laboratory research, a study titled "Shot Peening and the Fatigue of Metals," by H. F. Moore, for many years research professor of engineering materials at the University of Illinois, has been published. Among the subjects covered are: Types of structural damage of metals, how hot peening increases resistance to plastic distortion, th origin of fatigue cracks, the effects of cold working, measurement of shot peening intensity, examples of increased fatigue life from shot peening, and many others. The booklet is also illustrated by many microphotographs, charts and tables, and contains new research data.—*American Foundry Equipment Co., 555 S. Byrkit St., Mishawaka, Ind.*

POST-WAR QUESTION *for* TODAY:

Opposite to the practical advantages of present planning for the future, are the serious drawbacks connected with delay. Municipal executives who wait 'till war's end to initiate needed construction must then plan under pressure —will find competent engineering services pre-engaged by many—and may experience strong competition for contracting facilities in the general rush to build. Trade hectic activity *later* for considered planning *now* . . . arrange your financial, engineering and construction programs with expert technical assistance, for better design and lower eventual cost! *We'll be glad to consult with you*

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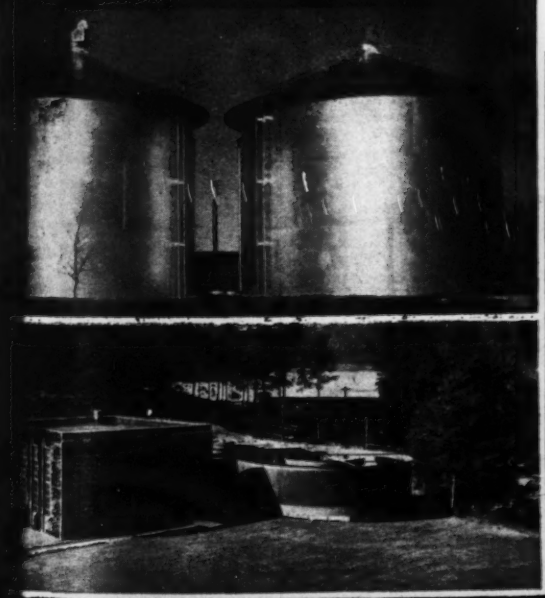

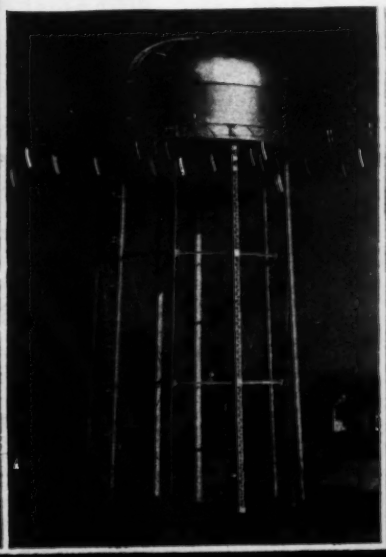

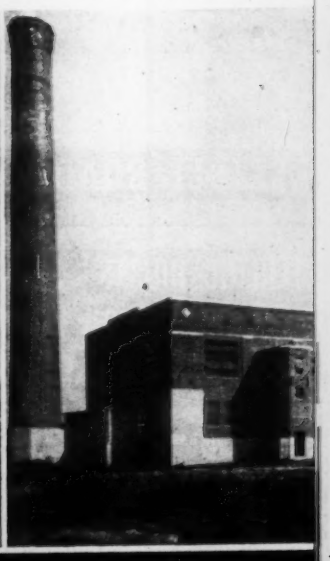

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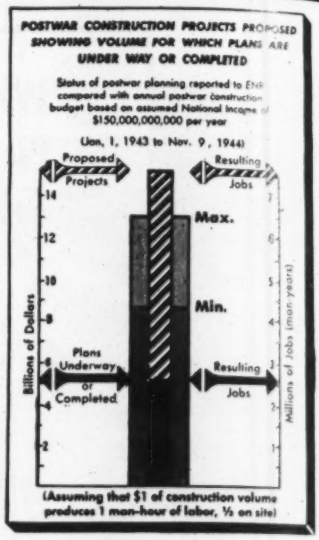
POSTWAR PROJECTS


POSTWAR CONSTRUCTION PROJECTS PROPOSED
SHOWING VOLUME FOR WHICH PLANS ARE
UNDER WAY OR COMPLETED
Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year
(Jan. 1, 1943 to Nov. 9, 1944)
Proposed Projects
Resulting Jobs
Max.
Min.
Plans Underway or Completed
Resulting Jobs
Billions of Dollars
Millions of Jobs (man years)
(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

Projects proposed for postwar construction have been published in these columns since January, 1943 as they have been reported to ENGINEERING NEWS RECORD.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

WATER SUPPLY

PROPOSED WORK

Mich., Corunna—Shiawassee Co., Corunna, WW. **$183,245.**

Mich., Crystal Falls—City, WW. **$46,130.**

Mich., Escanaba—City, WW, incl. pump. equip. and main extens. **$192,764.**

Mich., Iron Mountain — City, watermain extens. **$49,800.**

Mich., Midland—City, City Hall, WW. **$160,000.**

Mich., Negaunee—City, City Hall, WW. **$28,000.**

Mich., Pentwater—Village, WW. **$25,000.**

Mich., Plymouth—City, WW. **$70,000.**

Mich., Traverse City—City, WW. **$80,900.**

Mich., Ypsilanti—City, WW. **$185,163.**

N. H., Lincoln—Town, Selectmen, Town Hall, approx. 2¼ mi. watermain in D. W. Highway, **$40,000.** Financing not provided for.

N. Y., Freeport — Village, watermains, southern part of village, transmission and distr. **$200,000.** State Aid Planning Funds allotted.

N. Y., Hornell—City, imprv. water distr. sys. **$125,000.** State Aid Planning Funds allotted.

N. Y., Lancaster—Town, J. F. Schaefer, supervr., 27 Park Blvd., water exten. 6,500 ft. Pleasant View Dr. and Stutzman Rd., **$23,000**; 1,700 ft. Maple St., **$6,000.** CD 4/7—ENR 4/20.

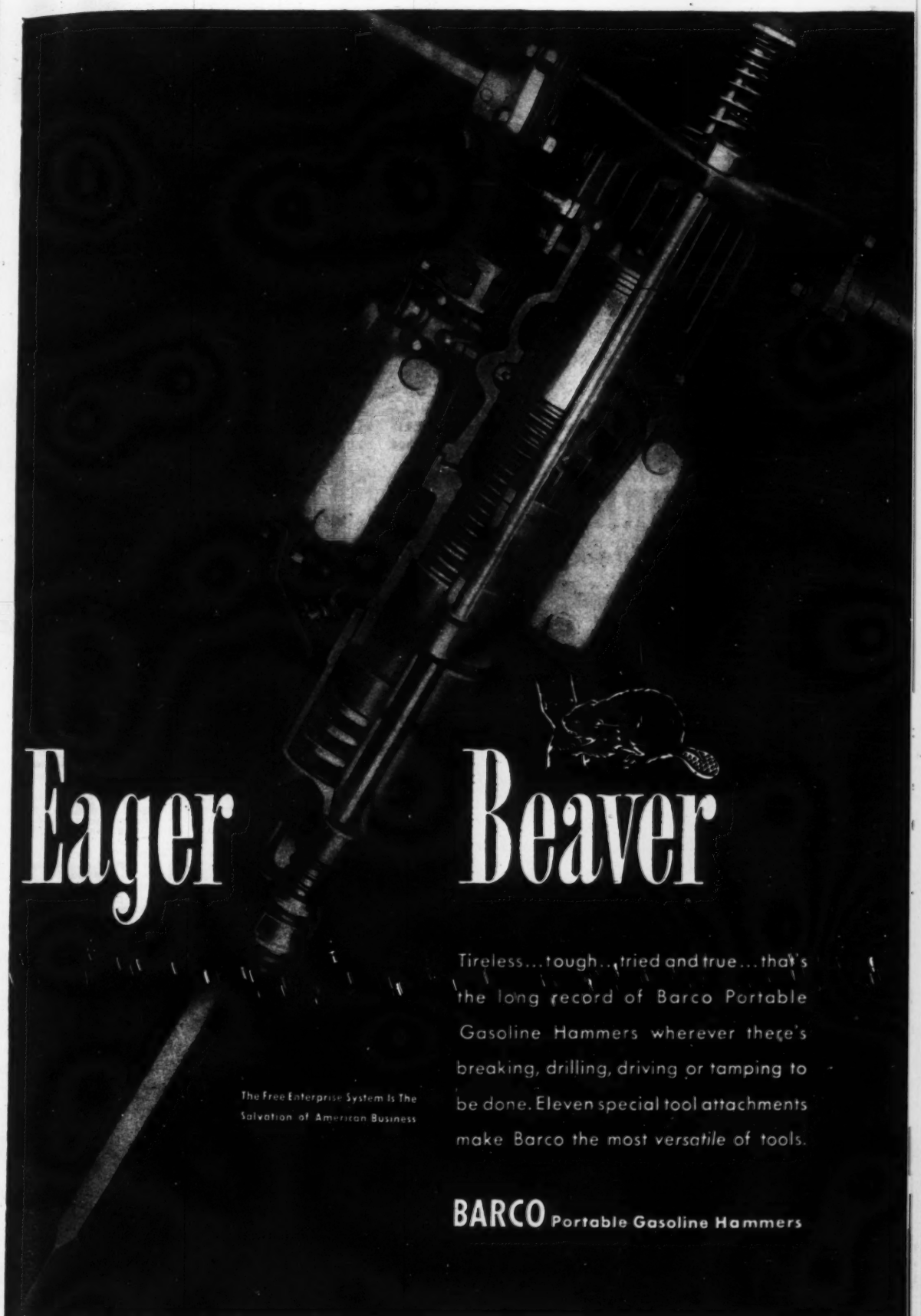
N. Y., Little Falls—City, water distr. sys. addn., West Main St. **$18,000.** State Aid Planning Funds allotted.

N. Y., Oyster Bay—Town, development addnl. water supply for Hicksville Water Dist. **$24,800.** State Aid Planning Funds allotted.

N. Y., Tonawanda—City, City Hall, addn. to filter beds and standpipe. **$143,000.** State Aid Planning Funds allotted.

N. Y., Westbury—Village, altering pumphouse, **$25,000**; water storage tank, **$60,000**; watermains in various streets, **$25,000.** State Aid Planning Funds allotted.

O., Fremont — City, J. D. Baughman, Safety-Service Dir., City Hall, 500,000 gal. elevated tank, 8 in. or larger water line in W. State St. **$175,000.** Land rights not cleared and financing not provided for.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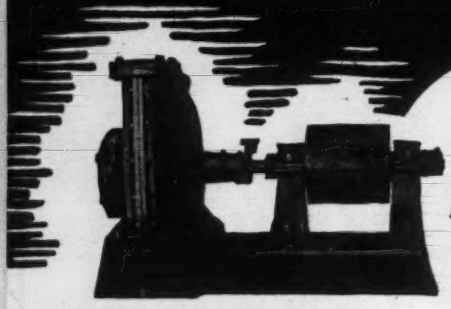

. . . and this year we supplied a spare part when the first major replacement was needed.

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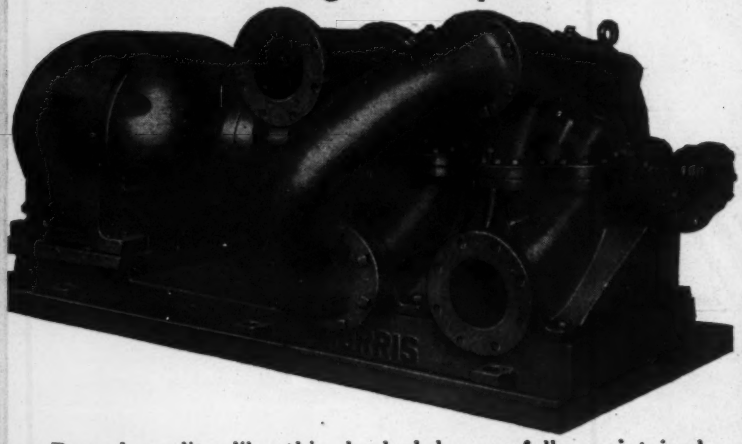

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MORRIS CENTRIFUGAL PUMPS

POSTWAR PROJECTS (Cont'd.)

S. C., Isle of Palms—Palm Re[illegible], Broad St., Charleston, exten. WW [illegible] area on island for development. $30,000.

Tex., Victoria—City, water [illegible] $50,000.

PLANS UNDER WAY

★**Colo., Denver**—City Water [illegible] Hall, plans under way for 5 [illegible] water supply program, 1945, Blue River development, etc., **$100,000**; Arrow Tu[illegible] and Ranch Creek Conduit, **$101,000**; [illegible]g Basin 1, Capitol Hill Reservoir, [illegible] replacing wood stave Conduit 2, $447,000; enlarging coagulation basin and sta[illegible] water reservoir, North Side Filter, $220,000; city pipe sys., **$250,000**; miscellaneous small construction jobs, **$100,000**; for 1946 Blue River Development, etc., **$100,000**; completing filtered water reservoirs, North Side Filter, **$157,000**; 5 m.g. filtered water reservoir, Moffat Filter, **$116,000**; replacing wood stave Conduit 5, **$250,000**; city pipe sys., **$350,000**; Ranch Creek Canal, **$380,000**; miscellaneous small construction jobs, $100,000; for 1947, Blue River development, etc., **$100,000**. Ranch Creek Canal, **$120,000**; enlarging North Side Filter, **$255,000**; city pipe sys., **$385,000**; miscellaneous small construction jobs, **$76,000**; for 1948, Blue River Development, etc., **$100,000**; Ranch Creek canal, **$200,000**; conduits, **$181,000**; city pipe sys. **$300,000**; miscellaneous small construction jobs, **$84,000**; for 1949, Blue River development, etc., **$100,000**; St. Louis Creek Conduit (Moffat Tunnel Div.), **$576,000**; city pipe sys., **$243,000**; miscellaneous small jobs, **$71,000**. Total cost for 5 year plan $5,831,000; addnl. imprvs., St. Louis Creek Conduit $774,000, addn. to North Side filters **$11,000**, enlarging Montclair Reservoir **$135,000**, Moffat Filter Plant addn. **$207,000**, conduits **$69,000**; addnl. imprvs. under Long-Range Planning, Blue River Diversion, incl. 2 Forks Reservoir, new conduit, city intake to Marston Lake, new and rebuilt basins, Capitol Hill Reservoir, rebuilt basins, Ashland Reservoir, extens. Moffat Tunnel Diversion. Funds available. D. D. Cross, ch. engr. CD 7/24—ENR 8/10.

Ia., Waterloo—City, R. B. Shipley, mayor, City Hall, 2 elevated water storage tanks, **$225,000**. E. E. Schenk, 214 Waterloo Bldg., consult. engr.

Mass., Hudson—Town, Water Dpt., E. F. Morgan, Jr., supt., Town Hall, plans 40% completed pump. station, 2 storage tanks. Metcalf & Eddy, Statler Bldg., Boston, consult. engrs.

★**Mich., Huntington Woods**—City, 12775 First St., plans 45% completed water-main extens., imprv. sys. incl. new mains. **$990,000**.

Mich., Kent City—Wyoming Twp., Kent City, plans under way WW sys. **$215,350**.

Mich., L'Anse—Village, plans under way WW sys. exten. **$29,042**.

N. Y., Mount Kisco—Village, plans 50% completed imprv. water sys. **$42,000**. Fowler Engineering Corp., Mount Kisco, consult. engr. CD 12/24—ENR 1/13.

N. Y., Mount Vernon—City, plans completed imprv. water supply in northeastern section, **$29,000**. Financing not provided for. A. Jewell, City Hall Bldg., water supt. CD 4/7—ENR 4/20.

N. Y., Ogdensburg—City, City Hall, duplicate watermain from low lift pump. station to high lift pump. station. **$75,000**. C. H. Lord, 6 Lafayette St., city engr.

N. Y., Oneonta—City, filtration plant, imprv. settling basin. **$35,000**. F. M. Gurney, city engr. CD 4/7—ENR 4/20.

N. Y., Scarsdale—Village, Reeves Newsom, mgr., City Hall, plans 40% completed water extens., imprvs. **$437,800**. H. J. Fairbanks, Scarsdale, principal engr. CD 4/20—ENR 5/4.

N. Y., Suffern—Village, plans 50% completed exten. water and sewer mains in Buena Vista Park, **$35,000**; enlarging watermains, **$20,000**; roof over present reservoir, **$6,000**; auxiliary reservoir, **$10,000**. Financing not provided for. T. M. Riddick, 369 E. 149 St., New York, archt. L. T. Purcell, 369 E. 149 St., New York, consult. engr. CD 4/7—ENR 4/20.

★**N. Y., Syracuse**—City, City Hall, plans completed 7,310 ft. 54 in. steel conduit line from source of supply at Skaneateles Gate House to Willow Glen Gate House. **$500,000**. Financing not provided for. N. F. Pitts, City Hall, city engr. CD 1/26—ENR 2/10.

N. Y., Watertown—City, preliminary plans completed removing watermain and walk and place on outside of steel structure. **$15,000**. Financing not provided for. H. Mallory, c/o Syracuse Engr. Co., Syracuse, consult. engr. F. E. O'Brien, city engr.

O., Bucyrus—City, City Hall, plans under way WW sys. imprvs. **$350,000**. Financing not provided for.

★**Wash., Bellingham**—City, Water Dpt., City Hall, watermain construction, replacements, etc., **$898,481**. E. W. Gooch, 210 Lottie St., City Hall, city engr.; dam and water line diversion South Fork Nooksack River to Lake Whatcom, **$734,000**. J. Cunningham & Associates, Spaulding Bldg., Portland, Ore., consult. engrs.

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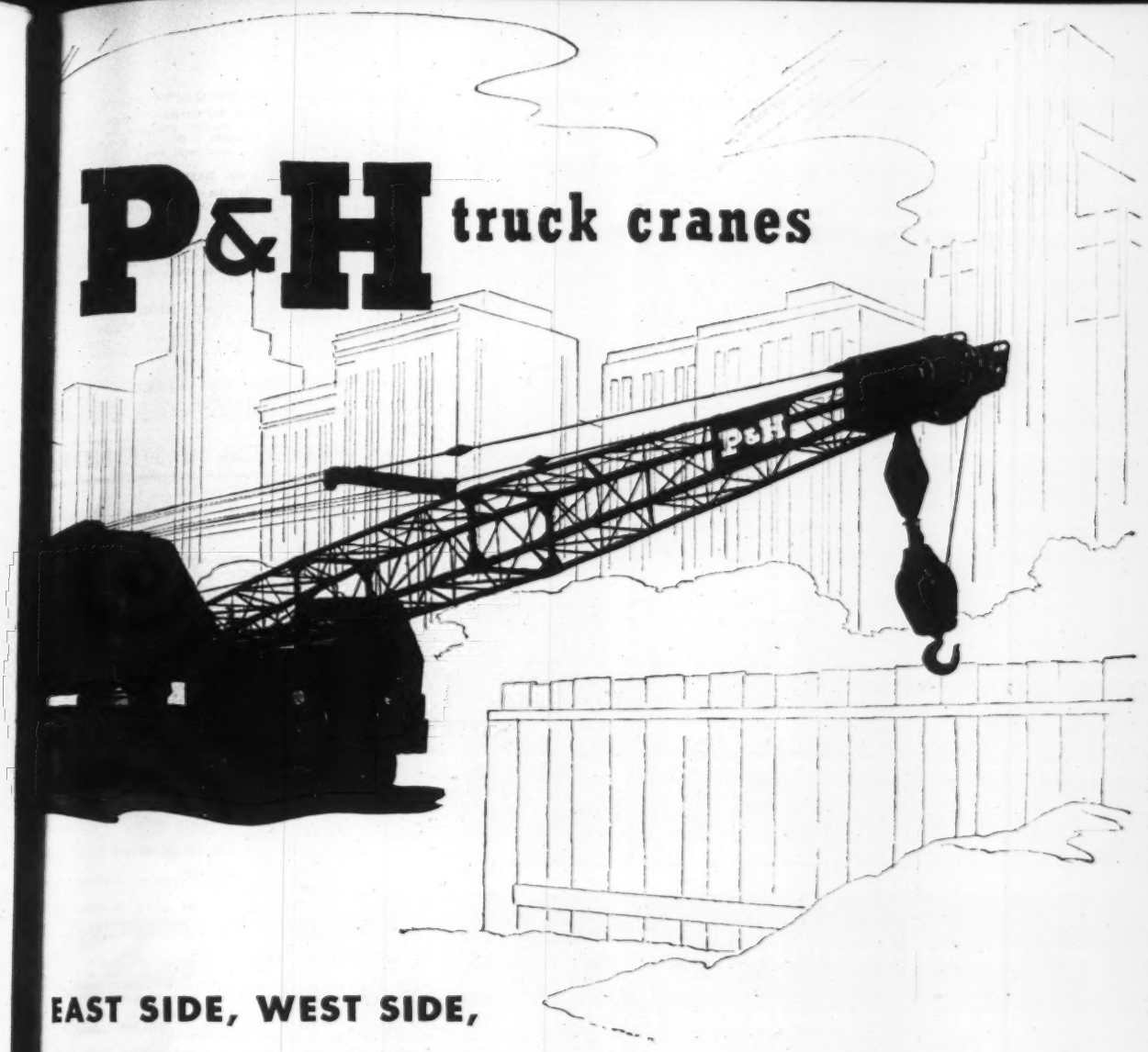

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POSTWAR PROJECTS (cont'd.)

Wis., Port Edwards—...age, C. A. Jas... tower. $35,000. W... ...tion plant. ... Carroll St., Madison. ... Kirchoffer, ...

READY FOR BIDS.

N. H., Berlin—City, ... Hall, plans ... pleted sedimentation ... treatment p... $25,000. E. E. Tanka... City Bldg. ... archt.

Ont., Campbellford—T... clk., plans completed ... voir and ... plant. About $75,000. ... Reid, ... Ave., Toronto, engr.

CONTRACTS AWARDED

Me., Auburn—Auburn Water Dist., ... Parker, supt., 268 Court ... plans com... extens., relaying c.i. wate... mains, own ... $15,000.

PROJECTS CANCELLED

N. Y., Batavia—City, ... Hall, cancel... filtration plant. $88,800. (D 3/3—ENR ...

SEWERS, WASTE DISPOSA...

PROPOSED WORK

★ **Conn., Greenwich**—Town, W. Johnson, Wks. Dpt., Town Hall, storm sewer sys., drains, etc., various streets and sects. $500,000.

Mass., Ware—Town, Bd. Selectmen, T... Hall, sewage disposal plant. Over $2...

Mich., Durand—City, City Hall, sewer... $53,430.

Mich., Fowler—Village, sewerage. $3...

★ **Mich., Hazel Park**—City, City Hall, West Nine Mile Rd., East Side Colle... Sewer, $500,000; 21 mi. lateral sewers ... exten. city sewerage sys., $332,640.

Mich., Iron Mountain — City, City H... sewage treatment plant, sewer exten. $... 300.

★ **Mich., Jackson**—City, sewerage, $2,... 000.

Mich., Mason—City, sewerage, $25,000.

Mich., Monroe—City, City Hall, sewer... $210,700.

Mich., New Buffalo—Village, sewer... $150,000.

Mich., Plymouth—City, City Hall, sew... age. $70,000.

Mich., Redford—Redford Twp., sewer... $100,000.

Mich., Williamston — Village, sewer... $38,500.

Mich., Ypsilanti—City, sewerage, $315,...

N. Y., Hornell—City, exten. storm sew... age sys. $100,000. State Aid Planning Fu... allotted.

N. Y., Kensington—Village, storm dra... Beverly and Arleigh Roads, $21,400; sw... ming pool repairs and sanitary sew... $10,000. State Aid Planning Funds allot...

N. Y., Sidney—Village, sewage treatm... plant, incinerator. $75,000. State Aid Pl... ning Funds allotted.

N. Y., Tonawanda—City, City Hall, imp... sewerage sys. in State, Scott and Fillm... Sts. $185,700. State Aid Planning Fu... allotted.

Tex., Victoria—City, sewers. $125,000.

Wis., Slinger—Village, L. J. Bull, ... City Hall, sewage treatment plant, sanit... sewers. $70,000.

PLANS UNDER WAY

Ariz., Kingman—Mohave Co., J. J. C... ningham, clk., Box 68, exten. Kingm... sewerage sys. $30,000. L. H. Foster, Ki... man, engr.

★ **Conn., New Britain**—City, Wm. Kra... clrn. P. Wks., City Hall, plans un... way sanitary trunk line South Main to ... posal plant, $80,000; Allen St., $11,400; Ro... Hill and Farmington Aves., etc. $61,... storm sewers, various sections, $140,875; ... lief and feeder sewer lines, $456,200; pu... incinerator, $250,000. G. W. Molleur, C... Hall, engr.

Ill., Winnetka—Village, studies and ... gotiations under way complete storm ... sanitary sewer program. $300,000 or m... R. L. Anderson, village engr.

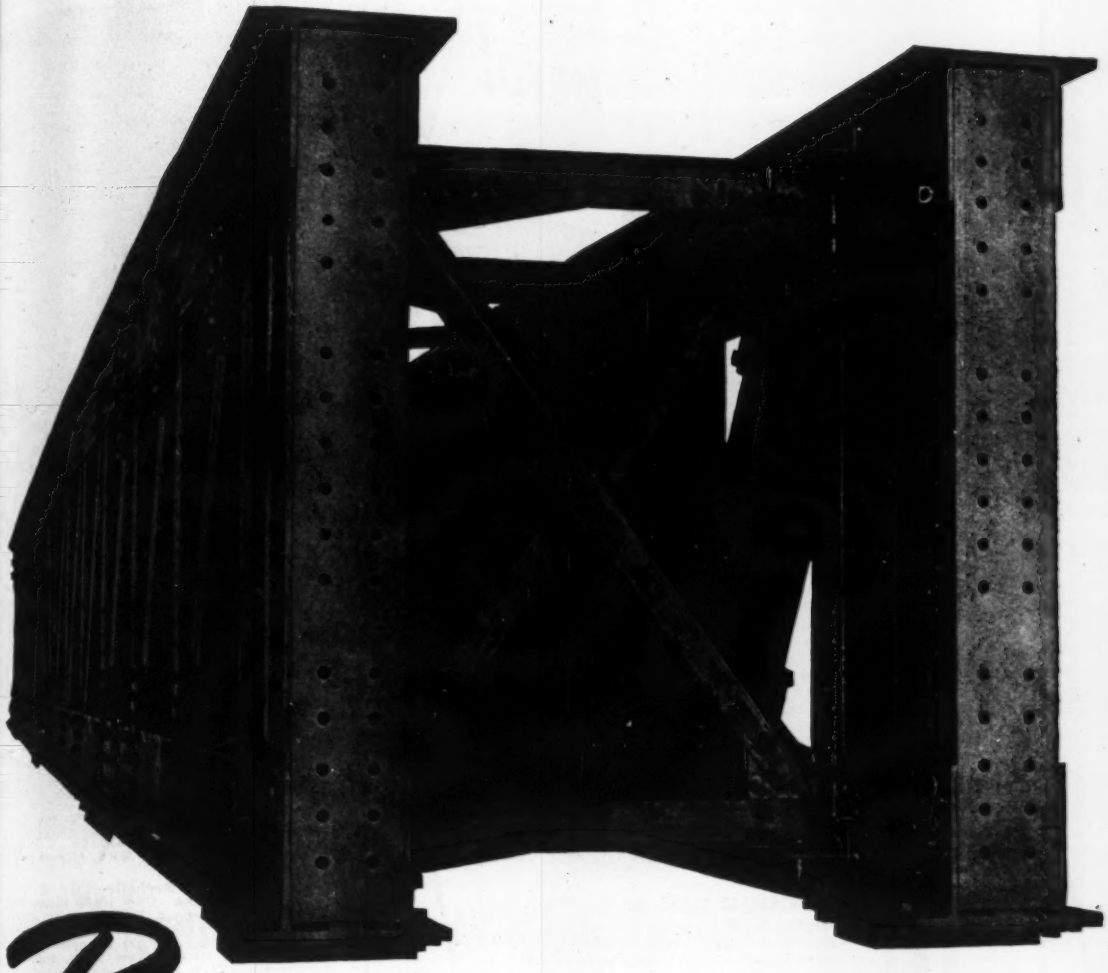
Me., Auburn—Auburn Sewerage Dist., ... K. Parker, supt., 268 Court St., plans ... completed vitr. clay combined sewerage s... south part of city, $25,000.

Mich., Alpena—City, City Hall, plans ... der way sewerage sys. exten., sewage tre... ment plant. $275,000.

Mich., Huntington Woods—City, City Ha... 12775 First St., plans 20% completed se... extens. $25,000.

Mich., Kalamazoo—City, preliminary $... under way sewage disposal plant. $... Jones & Henry, Toledo Trust Bldg., Tole... O., consult. engrs.

Mich., Marine City—City, plans under w... interceptor sewer and sewage treatm... works. Approx. $150,000. Pate & Hirn, Mo... gan Bldg., Detroit, consult. engrs.



Bridges for a ravaged land

dge building, ordinary riveted con-tion does not call for particularly tolerances. Yet today Bethlehem lding bridges with almost a watch-r's precision—bridges whose design or fabricating tolerances as close as 0 of an inch.

e reason? The bridges are tempo-demountable railway spans, made interchangeable members fastened her not with rivets but with drift and bolts. To make the bridges and easy to assemble, yet thor-y dependable in service, the inter-geable parts must fit together with ccuracy.

e holes which receive the fastenings must be accurately centered, to within 1/1000 of an inch, and of accurate diameter to within 8/1000 of an inch; and the drift pins and bolts must be machined to a tolerance of 5/1000 of an inch.

In the wake of the retreating Nazi horde, wrecked railways are being restored to service as rapidly as possible. The British, who are handling this job in western Europe, designed steel spans (deck and through) to serve as emergency bridges. A single span may extend to 85 feet; longer bridges may of course be constructed with piers.

The Unit Construction Railway Bridge, as the span is called, was first used in North Africa, where it won the approval of U. S. Army engineers. Bethlehem's Fabricated Steel Construction organization was assigned the major part of the task of mass-producing these knock-down bridges—nearly 1,000 deck and through spans, and 250 sets of spare parts, totaling 50,000 tons.

Five Bethlehem fabricating works are building these spans. To meet the close tolerances, which are naturally beyond those called for in a fabricator's ordinary line of work, special drilling jigs were built, and highly-accurate gages devised for testing.

Granted that these steel spans are "temporary" structures. Yet their substantial nature and serviceability, and the state of things in ravaged Europe, suggest that the bridges may be giving useful service for a long while to come.

★ BETHLEHEM STEEL ★

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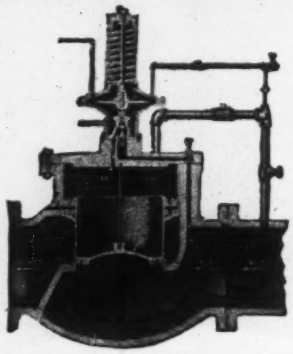

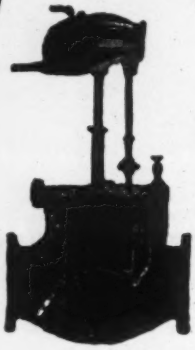

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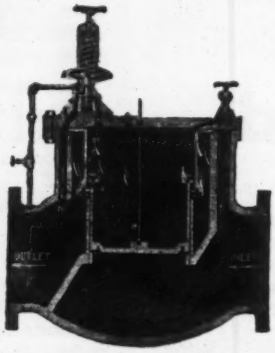

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POSTWAR PROJECTS (cont'd.)

Mich., Marshall—[illegible] plans under [illegible] sewerage sys. incl. tr[illegible]ent plant, $340.

Mich., Port Huron—[illegible]ort Huron, [illegible] plans under way, sewe[illegible] west side of [illegible] $325,000. L. G. Ho[illegible] city mgr. Gaskins, Marysville, en[illegible]

Mich., Traverse City—[illegible]y, City Hall, p[illegible] under way sewerage [illegible] exten., dup[illegible] works. $183,500.

Minn., Aitkin—Villag[illegible]o Clerk, Vil[illegible] Hall, sewage disposal [illegible]nt, lateral sew[illegible] Over $25,000. Hitchc[illegible] & Estabrook, Sexton Bldg., Minneap[illegible], consult. engr.

Mo., Slater—City, [illegible] D. Riley, ma[illegible] City Hall, sewers, sew[illegible] plant, $[illegible] R. R. Howard, City Ha[illegible] city engr.

★**N. Y., Batavia**—City[illegible] City Hall, pre[illegible] inary plans complet[illegible] pump. and tr[illegible] ment plants, sewage dis[illegible] plant and [illegible] erage sys. $751,000, [illegible] land rights [illegible] cleared. Nussbaumer & [illegible]urke, 347 Fra[illegible] lin St., Buffalo, Zone 2, [illegible] consult. engr. A[illegible] West, City Hall, city [illegible] CD 1/7–[illegible] 1/27.

N. Y., Fonda—Monroe Co., Fonda, [illegible] 60% completed 2.6 mi[illegible] to 54-in. con. storm sewers. $380,000. P. H. Ca[illegible] 244 S. Plymouth Ave., Rochester, dr[illegible] Wks.

N. Y., Great Neck—Village, T. H. M[illegible] Jr., clk., plans completed drainage, $62[illegible] Financing not provided for. A. Pilot[illegible] Neck, consult. engr. CD 4/7—ENR 4/[illegible]

N. Y., Mount Kisco—Village, sewer sy[illegible] street widening. $41,500. Fowler Engi[illegible] ing Corp., Mount Kisco, consult. engrs.

★**N. Y., Mount Vernon**—City, City H[illegible] plans completed sewer drains, W. 4[illegible] $9,300; W. 2 St., $10,100; sewers, E. [illegible] $13,400; W. 3 St., $11,600; sewer impr[illegible] Dell Ave., $13,000; Esplanade, $57,000; Ea[illegible] Lenox, Lexington and Oakland Aves., $5[illegible] S. 15 Ave., $9,800; trunk sewer Elm A[illegible] $24,000; Park Ave., $6,200; trunk sewer [illegible] Fletcher Ave., $12,000; Primrose Ave., $[illegible] Prospect Ave., $21,700; Oakley Ave., $7[illegible] Crary Ave., $25,000; N. 3 Ave., $20[illegible] Westchester Ave., $12,000; Grandview A[illegible] $7,500; Urban St., $13,000; sewers, E. [illegible] $20,000; E. 1 St., $15,000; Fleetwood A[illegible] $3,500; S. 12 Ave., $30,000; MacQue[illegible] Parkway North, $60,000; Prospect A[illegible] $7,902; drain pipe from Wartburg La[illegible] $62,700; drain in easement of school pr[illegible] erty, $14,000; in N. Y. C. R. R. prope[illegible] $6,000; plans 30% completed sewer impr[illegible] Claremont Ave., $90,000; plans 90% [illegible] pleted Ellwood Ave., $30,000. Financing [illegible] provided for. C. M. Hick, city engr. CD [illegible] —ENR 4/20.

★**N. Y., New Rochelle**—City, E. T. Cra[illegible] dir. P. Wks., City Hall, plans 60% [illegible] pleted Stephenson Drain, entire length [illegible] Long Island Sound to Lord Kitchener [illegible] $2,100,000. Havens & Emerson, Woolw[illegible] Bldg., 233 Bway., New York, consult. en[illegible] CD 4/7—ENR 4/20.

★**N. Y., New York**—Dpt. P. Wks., Muni[illegible] pal Bldg., Zone 7, plans under way U[illegible] West Side Intercepting Sewers, exten[illegible] Wards Island Plant. $27,800,000. B. [illegible] Gould, engrs. CD 2/1/43—ENR 2/4/43

★**N. Y., Ogdensburg**—City, City Hall, p[illegible] liminary plans completed sewage disp[illegible] plant, $500,000; sewer outlets, $150,000. La[illegible] rights not cleared, financing not provided f[illegible] Barker & Wheeler, 36 State St., Alba[illegible] consult. engrs. C. H. Lord, 6 Lafayette S[illegible] Ogdensburg, city engr. CD 12/16—E[illegible] 12/23.

N. Y., Oneonta—City, plans 5% comple[illegible] garbage disposal plant. $50,000. P. [illegible] Gurney, city engr. CD 4/7—ENR 4/20.

★**N. Y., Port Richmond**—Dpt. P. W[illegible] I. V. A. Huie, comr., Municipal Bld[illegible] New York, Zone 7, plans under way sew[illegible] treatment works, Proj. PS-101, $760,000. H. Gould, engr. CD 1/25/43—ENR 1/28

N. Y., Scarsdale—Village, R. Newse[illegible] mgr., Village Hall, reconstructing sanita[illegible] sewer in Brookline and Locust Lane Ar[illegible] $39,000; plans 25% completed storm dra[illegible] for 4 roads, $43,000; plans 60% comple[illegible] storm drains in Graham Rd., $20,000; Bro[illegible] ster Rd. to Brite Ave., $3,000; Griffen A[illegible] Water Shed, $15,000; Cooper Rd., $12,[illegible] Upper Fox Meadow, $10,000. H. J. Fa[illegible] banks, Scarsdale, principal engr. CD 4/[illegible] 6/21—ENR 5/4, 6/29.

★**N. Y., Syracuse**—City, City Hall, pl[illegible] completed 6- to 78-in. rein.-con. [illegible] vitr. clay or plain concrete combined se[illegible] in Midland Ave., $675,000; 10- to 48-in. [illegible] Blvd. and Harbor St., $40,000; 6- to 36-[illegible] Oneida St., $50,000; 6- to 42-in. Cather[illegible] St., $70,000; storm sewer in State Fair a[illegible] Hiawatha Blvds., $58,000; 5- to 48-in. Ne[illegible] Midler Ave., $160,000; 6- to 18-in. vitr. cl[illegible] or concrete West Borden Ave., $26,000; 5-[illegible] 24-in. vitr. clay on concrete storm se[illegible] Enfield Pl., Kimber and Lockwood Rd[illegible] $70,000; 5- to 18-in. storm and sanit[illegible] sewers Edgemont Dr., $130,000; reinf[illegible] 6- to 24-in. sewer Madison St., $45,[illegible] 6- to 66-in. Onondaga St., $110,000; 6- to [illegible] in. Palmer Ave., $15,000; 5- to 15-in. vi[illegible] clay or concrete storm sewer in Gr[illegible] Blvd., $11,000. Financing not provi[illegible] for on foregoing projects; plans 50% [illegible] pleted 10- to 18-in. storm relief sewer

"I hear the war's practically over... back home!"

PROBABLY it's only natural for us here at home to feel that the war's almost won, the way the good news has been pouring in.

But the war's not over for *him—not by a long sight!* And he's just one of a few million or more that will stay over there until they finish the bloody mess. Or kill time for a few months—or years—in some hospital.

What about *you?*

This is no time to relax. No time to forget the unfinished business. It's *still* your war, and it *still* costs a lot.

So dig down deep this time. Dig down till it hurts, and get yourself a hundred-dollar War Bond over and above any you now own —or are now purchasing. This 6th War Loan is every bit as important to our complete and final Victory as was the first.

Don't "let George do it"—get *yourself* that *added* bond and help finish a magnificent job *right.* The quicker you reach down deep, the better you do *your* job for war, the more you'll contribute to ending the fight. And the quicker they'll come back—the guys that can *still* be killed.

After all, you're safe and sound and *home. That's worth another hundred-dollar bond to you, isn't it?*

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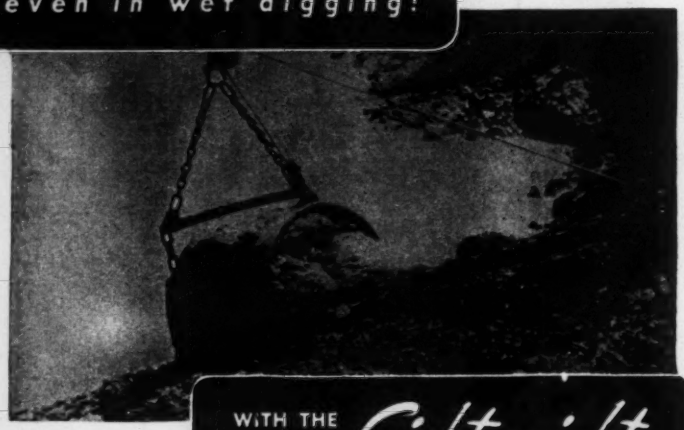
...even in wet digging!



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★ **3 Types, ⅛ to 30 Cubic Yards**
Light, medium and heavy duty.

★ **20% to 40% Lighter Than Other Buckets**
Permits greater ease of handling.

★ **All-Welded Construction**
No rivets to work loose.

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Chains and all fittings.

No matter what the digging conditions may be, the Hendrix Lightweight naturally moves more material, and moves it faster! It is a bucket that is light, yet strong . . . easy to handle on small machines or on long booms.

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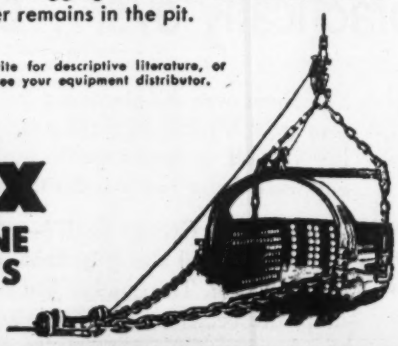

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Wood Preservers Since 1878
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MITCO
OPEN STEEL FLOORING

Pressure Formed
90% Open Area
Easy to Install

Hendrick Manufacturing Company
60 Dunkirk Street, Carbondale, Pa.

POSTWAR PROJECTS (Cont'd.)

Shotwell Park, **$29,000**; plans completed 6- to 72-in. combined sewers in Onondaga and Harrison Sts., **$325,000**; plans 10% completed 6- to 24-in. sanitary sewer in Erie Blvd., **$150,000**. N. F. Pitts, City Hall, city engr. CD 4/7—ENR 4/20.

N. Y., Warsaw—Village, L. H. Bishop, clk., Village Hall, plans completed incinerator plant. **$28,855**. Financing not provided for. T. J. Morrison, 373 Grand Ave., Rochester, archt. CD 1/27—ENR 2/10.

★**N. Y., White Plains**—Westchester Co., White Plains, plans 50% completed 3,800 ft. storm water drain imprvs., Central Ave. in Yonkers, from Sherman Ave. along Central Park Ave. to Dewey Ave., along Dewey Ave. to Sunnybrook, along Sunnybrook from Cross Co. Parkway to Midland Ave., 36- to 78-in. rein.-con. pipe and 75 ft. tunnel, **$108,000**; preliminary plans 75% completed storm water control, channel imprvs., tunnel and flood reservoir Blind Brook, **$560,000**; preliminary plans 60% completed Sheldrake River, **$510,000**; preliminary plans 70% completed channel imprvs., bridges, Mamaroneck River, **$635,000**; preliminary plans 55% completed Bronx River, **$875,000**; preliminary plans 20% completed channel imprvs., Beaver Swamp Brook, $75,000; preliminary plans 5% completed flood reservoir Saw Mill River Proj., **$935,000**. J. W. Reymond, Jr., consult. engr., and C. A. Garfield, engr., both County Office Bldg. CD 1/12, 3/9—ENR 1/27, 3/23.

O., Cambridge — City, City Hall, plans under way sewage disposal plant. **$285,000**. Financing not provided for. F. G. Browne, Box 134, Marion, consult. engr.

★**O., Toledo**—Bd. Comrs., Lucas Co., Toledo, plans under way 43.4 mi. sewers, 15.3 mi. water line extens., and 4.6 mi. reinforcing watermains. **$3,000,000**. Financing not provided for. S. C. McKee, Court House, co sanitary engr.

★**O., Youngstown**—City, R. W. O'Neill, mayor, City Hall, preliminary plans sewage treatment plant, intercepting sewer lines, **$2,500,000**. Financing not provided for. J. C. Ryan, City Hall, engr. CD 9/29/43, 3/16/44—ENR 10/7/43, 4/6/44.

★**Wash., Bellingham**—City Street Dpt., Bellingham, sanitary and storm sewers, separation sanitary and storm sewers, **$641,000**. E. W. Gooch, 210 Lottie St., city engr.

Ont., Grand Bend—Municipality, complete sewerage sys. **$60,000**. G. G. Reid, 7 Edmund Ave., Toronto, engr.

Ont., Ingersoll—Municipality, R. McNiven, clk., sewerage sys., sewage disposal plant, **$90,000**. Armstrong Wood & Co., 62 W. Richmond St., Toronto, engrs. CD 6/16—ENR 7/13.

READY FOR BIDS

Minn., Howard Lake—City, A. C. McCraw, clk., plans completed sanitary sewerage sys., disposal plant. Over **$50,000**. Hitchcock & Estabrook, 521 Sexton Bldg., Minneapolis, consult. engrs. CD 2/3—ENR 2/24.

N. Y., Scarsdale—Village, Reeves Newsom, mgr., plans completed incinerator addn., **$17,500**; sanitary sewers, **$18,500**. H. J. Fairbanks, Village Hall, principal engr.

BRIDGES

PROPOSED WORK

Mass., Ware—Town, Bd. Selectmen, Town Hall, underpass, railroad crossing elimination. Over **$25,000**.

★**Mich., Ann Arbor**—Washtenau Co. Road Comn., Ann Arbor, 9 bridges. **$185,000**.

Mich., Corunna—Shiawassee Co. Road Comn., Corunna, 6 bridges. **$85,000**.

Mich., Hart—Oceana Co. Road Comn., Hart, 3 bridges. **$52,000**.

Mich., Hastings—City, bridge. **$70,000**.

Mich., Holland—Ottawa Co. Road Comn., Holland, 1 bridge. **$135,000**.

Mich., Howell—Livingston Co. Road Comn., Howell, 5 bridges. **$70,000**.

Mich., Ithaca—Gratiot Co. Road Comn., Ithaca, 4 bridges. **$80,000**.

Mich., Mason—Ingham Co. Road Comn., Mason, 1 grade separation. **$150,000**.

Mich., Midland—Midland Co. Road Comn., Midland, 9 bridges. **$298,000**.

Mich., Mt. Pleasant—Isabella Co. Road Comn., Mt. Pleasant, 16 bridges. **$222,000**.

Mich., Pontiac—Oakland Co. Road Comn., Pontiac, 8 bridges. **$191,000**.

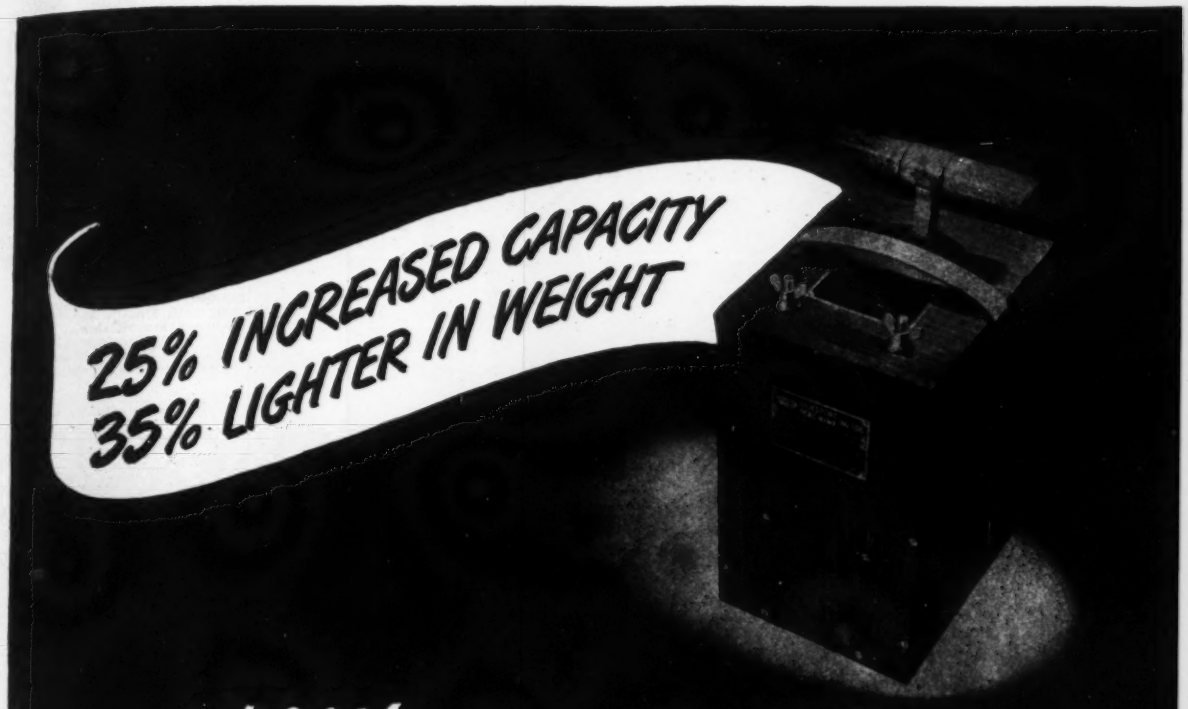
Mich., Port Huron—St. Clair Co. Road Comn., Port Huron, 9 bridges. **$208,000**.

Mich., Rogers City—Presque Isle Co. Road Comn., Rogers City, 4 bridges. **$61,000**.

Mich., St. Johns—Clinton Co. Road Comn., St. Johns, 2 bridges. **$53,000**.

Mich., Standish—Arenac Co. Road Comn., Standish, 4 bridges. **$180,000**.

R. I., Newport—City, Dpt. P. Wks., City Hall, new type bridge over Goose Creek. Over **$25,000**.



NOW Du Pont offers a new and greatly improved 100-hole blasting machine

AGAIN Du Pont has contributed to the blasting industry by offering a completely new 100-hole blasting machine with several outstanding features:

First—Its electrical output has been increased approximately 25%. This reserve capacity further decreases the possibility of misfires.

Second—Its weight has been reduced by 14½ lbs., or more than one-third. It is therefore much easier to carry and handle.

Third—Its mechanism has been completely re-designed. Knowledge gained from years of experience has been utilized to increase its strength and durability.

Fourth—The rack bar operates with greater ease and smoothness, and its handle has been lengthened to provide the operator with a better grip.

Fifth—The case has been increased in width and decreased in height, to provide greater stability in use.

This new Du Pont No. 100 Blasting Machine is the answer to your demands for a stronger, more efficient machine to fire large numbers of electric blasting caps in straight series. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department Wilmington 98, Delaware.

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	Old	New
Output (amps at 320 ohms total resistance)	1.60	2.0
Weight	40½ lbs.	26 lbs.
Height of Machine (Rack bar down)	18⅛"	16¾"
Height of Machine (Rack bar up)	26⅜"	23½"
Height of Case	14⅜"	13"
Depth of Case	9¾"	9"
Width of Case	6¾"	7½"
Length of Handle	6"	7¼"

DU PONT

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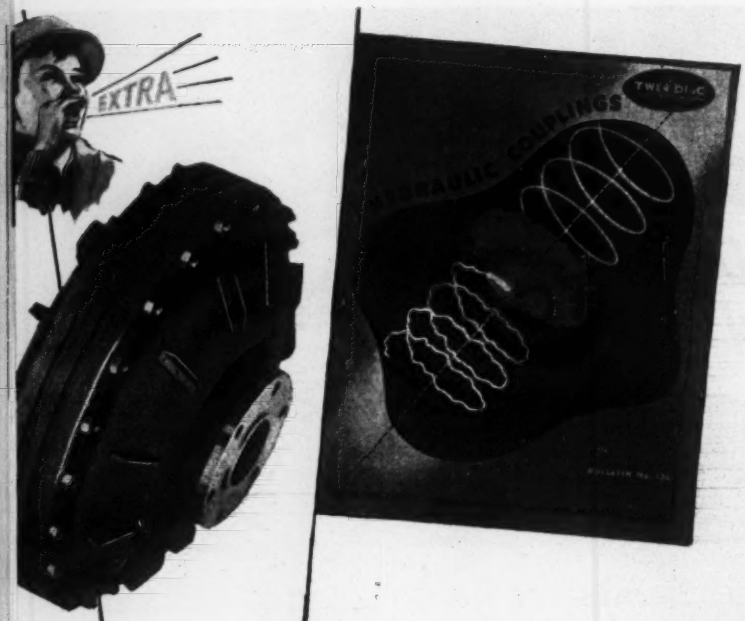

ATEST NEWS ON
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all types of equipment driven by internal combustion en-
es, there is a definite trend toward hydraulic couplings as the
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t of a driven unit, and that this cost can be sharply reduced
ough the use of hydraulic couplings. In addition, an hy-
ulic coupling will give the machine added flexibility . . . a
other work cycle.

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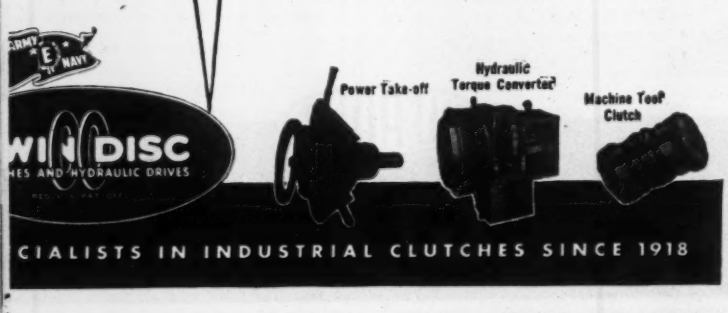

POSTWAR PROJECTS (Cont'd.)

PLANS UNDER WAY

Ala., Montgomery—Montgomery Co., [illegible] ft., concrete, steel combination arch and girder spans, three 30 to 40 ft. concrete steel relief openings, replacing old obsolete truss span and relief openings, mar. [illegible] **$75,000-$100,000.** Thos. H. Edwards, [illegible] 1414, engr.

N. Y., Binghamton—City, City Hall, [illegible] 50% completed repairing Court St. bridge, **$100,000.** Financing not provided. Fretts, Tallamy, Senior & Forrestal, [illegible] Williamsville Branch, P. O. Buffalo, consult. engrs. J. A. Giles, city engr. CD [illegible] ENR 3/23.

N. Y., Binghamton—Comrs. Broome Co., Binghamton, plans 25% completed 300 ft. Bridge 1, and approaches, Lisle, **$100,000;** plans 20% completed bridge, approaches on West Franklin Rd., **$55,000;** Bridge 3, bridge and approaches, **$65,000,** both Union; 60% Bridge 2, and grade separation, Kirkwood-Conklin Rd., **$275,000;** plans 10% completed Bridge 4 on Mill St., Deposit, **$45,000;** plans Bridge 6, Vestal, **$50,000.** CD 3/31—ENR 4/20.

N. Y., Canandaigua—Ontario Co., G. Chester, supt. Hys. Canandaigua, preliminary plans and surveys 50% completed replacing 16 bridges, span of bridges 25 to 50 ft. twin spans with center pier, width of roadway 24 ft., concrete abutments and wings, I-Beam stringer type with rein.-con. decks, 50% rock and 50% pile fdn. **$197,000.** Engineering Staff, Ontario Co. Hy. Dpt., Court House, Ontario, engr. CD 5/24—ENR 6/1.

N. Y., Fonda—Monroe Co., Fonda, plans 70% completed I-Beam rein.-con. slab deck bridges, bituminous macadam approaches, incl. Archer Bridge, two 50 ft. span concrete on pile fdn.; N. Hamlin, Lake and Breman Bridges, all two 50 span, concrete on rock fdn.; Hamlin-Parma Bridge, two 30 ft. span, concrete on soil fdn.; Cheese Factory Bridge, two 40 ft. and one 30 ft. span, concrete on pile fdn., Bowerman Bridge, two 60 ft. span, Wheatland Center and Union St. Bridges, both two 50 ft. spans, concrete on rock fdn. **$330,000.** CD 8/16—ENR 9/7.

N. Y., Kingston—Ulster Co., Kingston, preliminary plans 32% completed constructing Sundown Bridge, **$14,000;** 30% completed Ulster Heights Bridge, **$12,000;** plans Phoenicia Bridge, **$20,000.** J. F. Loughran, 74 John St., co. supt.

N. Y. Lockport—Niagara Co., R. Rumsey, supt. County Hys., Lockport, plans 40% completed 40 ft. span I-beam, Bridge 20, Proj. 2143, **$7,000;** Bridge 72, Proj. 2162, **$6,000;** Bridge 30, Proj. 2144, **$7,000;** Bridge 10, Proj. 2145, **$7,000;** Bridge 12, Proj. 2146, **$8,000;** Bridge 19, Proj. 2148, **$7,000;** 30 ft. span I-beam, Bridge 16, Proj. 2147, **$7,000;** Bridge 78, Proj. 2164, **$6,000;** 42 ft. span I-beam, Bridge 25, Proj. 2149, **$7,000;** 57 ft. plate girder, Bridge 27, Proj. 2150, **$10,000;** Bridge 29, Proj. 2151, **$12,000;** four 140 ft. span I-Beam Bridge 34, Proj. 2152, **$40,000;** Bridge 36, Proj. 2153, **$20,000;** Bridge 37, Proj. 2154, **$35,000;** 70 ft. span plate girder Bridge 38, Proj. 2155, **$16,000;** 50 ft. Bridge 80, Proj. 2165, **$8,000;** Bridge 81, Proj. 2166, **$8,000;** 45 ft. I-Beam span Bridge 64, Proj. 2157, **$7,000;** Bridge 65, Proj. 2158, **$7,000;** 35 ft. I-beam Bridge 67, Proj. 2159, **$6,000;** Bridge 68, Proj. 2160, **$5,000;** 35 ft. I-beam Bridge 77, Proj. 2163, **$6,000;** major repairs necessary 26 ft. span Bridge 47, Proj. 2156, **$3,000.** CD 5/24—ENR 6/1.

★**N. Y., New York and Brooklyn**—Dpt. P. Wks., I. V. A. Huie, comr., Municipal Bldg., New York, Zone 7, plans under way reconstructing, imprv. Brooklyn Bridge, PW-95. **$580,000.** R. H. Gould, engr. CD 6/17/43—ENR 6/24/43.

★**N. Y., New York**—Dpt. P. Wks., I. V. A. Huie, comr., Municipal Bldg., Zone 7, plans under way removing center island, etc., Manhattan Plaza, Williamsburg Bridge, PW-97, **$304,000;** traffic ramp from Welfare Island to Queensboro Bridge, PW-100, **$1,760,000.** R. H. Gould, engr. CD 2/15/43—ENR 2/18/43.

★**N. Y., New York**—Dpt. P. Wks., I. V. A. Huie, comr., Municipal Bldg., Zone 7, plans under way outer roadways on Williamsburg Bridge, PW-24, **$550,000.** R. H. Gould, engr. CD 1/29/43—ENR 2/4/43.

N. Y., Oneonta—City, Neawha Park Bridge, **$35,000.** F. M. Gurney, city engr. CD 4/7—ENR 4/20.

N. Y., Schoharie—Comrs. Schoharie Co., L. J. Wright, supt., Schoharie, plans 50% completed constructing County Bridge 19, Gallupville, **$25,000;** Standard Engineering Co., 444 Bway., Albany, consult. engrs.; preliminary plans 50% completed bridge on Sharon-State Rt. 10, **$6,000,** abutment and repairs at Wright **$4,500,** new bridge replacing County Bridge 66, **$7,000,** preliminary plans 60% completed Conesville-Bridge on Pangburn Rd., West Conesville, **$6,000,** bridge on Jefferson Rd. **$4,000,** Ryder Bridge, Richmond, **$10,000.** Schoharie Co. Hy. Dpt., Schoharie, engr.

N. Y., White Plains—Westchester Co., White Plains, plans completed removing existing steel truss bridge, construct new 35 ft. span I-Beam Bridge with 22 ft. roadway, concrete deck and abutments, bituminous pavement approaches, on Mathews Mills Rd., **$25,000;** 47 ft. span rein.-con. bridge with

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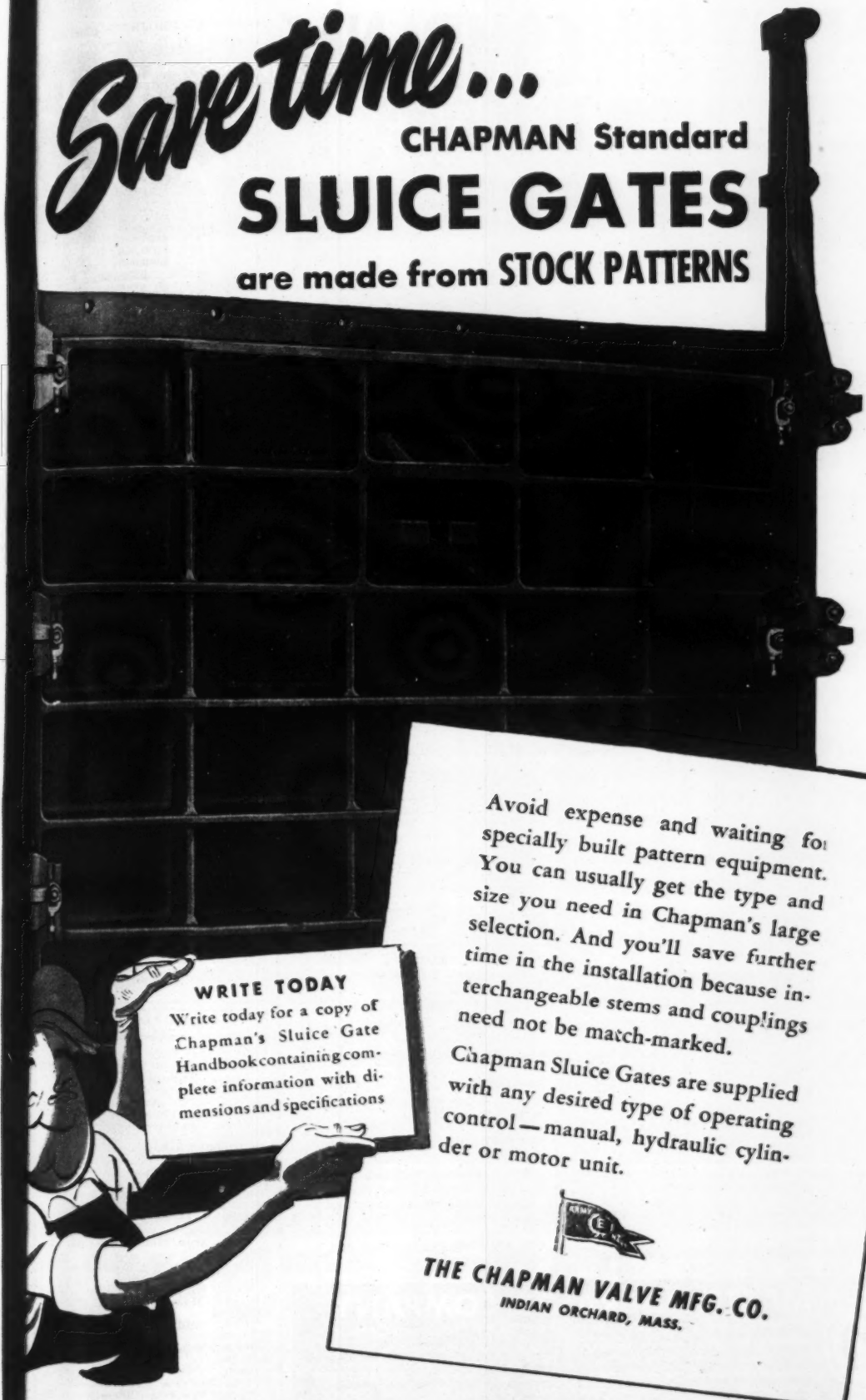

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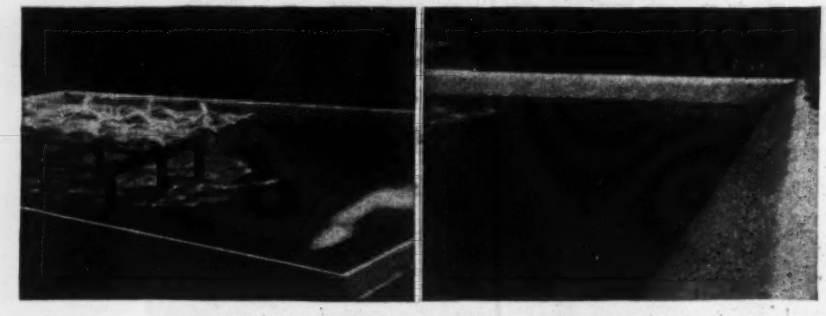

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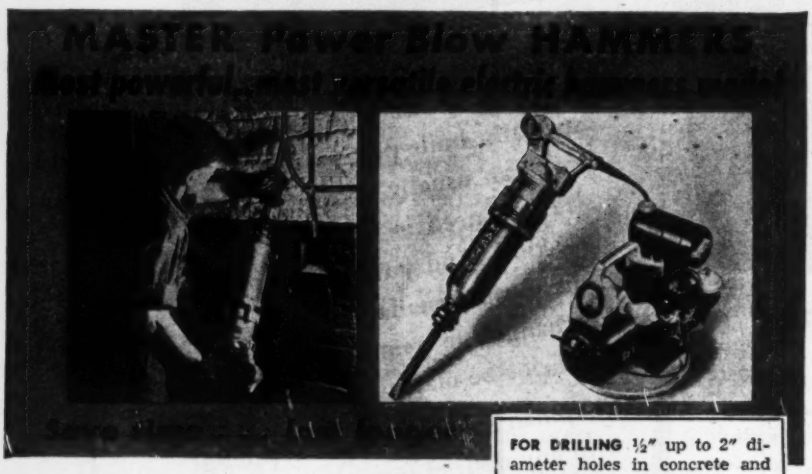

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POSTWAR PROJECTS (Cont'd.)

pile fdn., 22 ft. ... bituminous ... dam approaches, ... existing ... South Bedford Rd., $35,000; ... House Rd. Bridge, $18,500, and ... Dock Rd. Bridge, $11,700. Financing provided for. C. A. ... field, Conn. Bldg., engr.

O., Athens — ... House, steel, concrete ... Athens Co. ... completed bridge ... ridge, $32,000; ... not provided for. ... $28,500. P... Doss, Court ... engr.

★**Pa., Phila.**—City ... City Hall, plans ... der way steel, ... crete highway ... Proj. WE63, $370,000; ... Proj. WE65, ... Proj. WE66, $350,000; ... Proj. WE67, ... Proj. WE68, $350,000; ... Proj. WE69, ... Proj. WE70, $350,000; ... Proj. WE71, ... Proj. WE72, $350,000; ... Proj. WE73, $300,000; ... Proj. WE75, ... Proj. WE76, $350,000; ... Proj. ... $150,000; grade cross ... elimination ... WE39J, $1,000,000; ... WE37J-1 ...

Rhode Island—State Dpt. Hys & ... Providence, plans under ... way Kin... Bridge 403, over $100,000. Fay, Spo... Thornkide, 11 Beacon St., Boston, ... consult. engrs.; Nooseneck Hill Rd. ... 402, over $100,000, J. R. Worcester & ... Milk St., Boston, Mass., consult. engrs. ... bridges concrete, steel, in Richmond ... Hope Valley.

Wash., Bellingham—City Street Dept. ... Hall, plans under way replacing 4 ... bridges, new bridge, $349,000. State Hy. ... Olympia, consult. engr. E. W. Gosl... Lottie St., city engr.

Wash., Tacoma—Pierce Co., Court ... concrete bridge from Fox Island to ... land. $275,000. L. M. Corey, Co... co. engr.

Wyoming—State Hy. Dpt., J. R. B... supt., Cheyenne, plans under way ... bridges, approaches, Proj. 5, $200,000; ... overhead crossings, approaches, P... $150,000; 1.2 mi. Proj. 7, $135,000.

READY FOR BIDS.

Fla., Jacksonville—Bd. Comrs. Duv... Court House, plans completed 6x7 ... crete bridge, 24 ft. roadway over M... Creek on exten. of Edgewood Ave. ... Reynolds, Smith & Hills, Duval Bldg. ... 2, consult. engrs. A. N. Sollee, 30... House, Zone 2, co. engr. CD 2/18/43 ... 2/18/43.

N. Y., New York—Dpt. P. Wks., ... Huie, comr., Municipal Bldg., Zone ... completed reconstructing Panel Pe... Williamsburg Bridge, PS-22, $62,000. ... Gould, engr. CD 1/29/43—ENR 2/4...

CONTRACTS AWARDED

N. Y., Malone—Comrs. Franklin ... F. W. Wright, supt., Courthouse, ... bridge, Bombay South Bombay Rd. ... Constable Village Bridge, $8,000; brid... Hatch Brook, Franklin, $6,000; Brid... View, Belmont, $8,000; 2 bridges P... ricks Creek, $7,000; bridge, Bombay-H... burg Rd., $5,000, own forces. CD ... ENR 2/10.

N. Y., Norwich—Chenango Co., N... plans 75% completed Bridge 2 over ... gantslet Creek, $15,000; Bridge 4 in ... $8,000; Bridge 1, in Rockdale, ... Bridge 5, in Oxford, $30,000; brid... North Norwich, $7,000; Bridge 3, in ... burne, $10,000, own forces. Land ri... cleared and financing not provided. ... W. H. McFarland, Port Dickinson, ... hamton, consult. engr. E. B. Pendl... West Park Pl., Norwich, co. supt. hy... engr. CD 3/2—ENR 3/23.

STREETS AND ROADS

PROPOSED WORK

Mich., Alma—City, 5 streets, $293,1...

Mich., Atlanta—Montmorency Co. ... Comn., Atlanta, 3 roads. $79,700.

★**Mich., Bad Axe**—Huron Co. Road ... Bad Axe, 10 roads, $527,000.

Mich., Cadillac—Wexford Co. Road ... Cadillac, 6 roads, $179,200.

★**Mich., Cheboygan**—Cheboygan Co. ... Comn., Cheboygan, 6 roads. $...

Mich., Clawson—City, City Hall, ... $66,329.

Mich., Durand—City, street (... $46,750.

Mich., Howell—Livingston Co. ... Comn., Howell, 2 roads. $76,000.

Mich., Iron Mountain—City, street ... 000.

Mich., Ithaca—Gratiot Co. Road ... Ithaca, road. $50,000.

Mich., Kingsford—Village, street. $...

Mich., Manistee—City, City Hall, ... $195,000.

Mich., Midland—City, City Hall, ... $283,000.

Mich., Monroe—City, City Hall, 2 s... $136,200.

Mich., Stanton—Montcalm Co. ... Comn., Stanton, road. $45,000.

Mich., Traverse City—Grand Traver... Road Comn., Traverse City, 5 ... $184,713.

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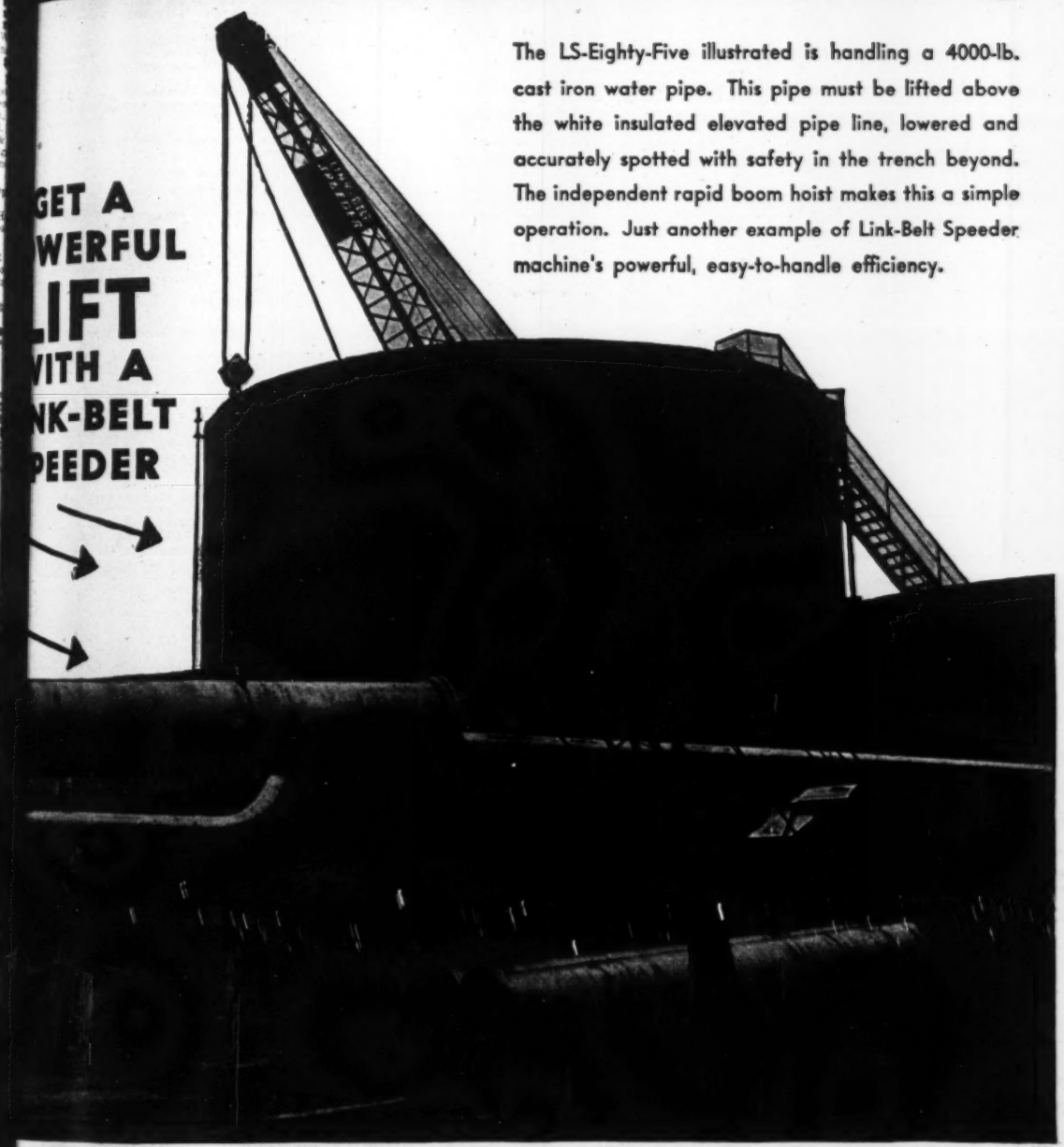

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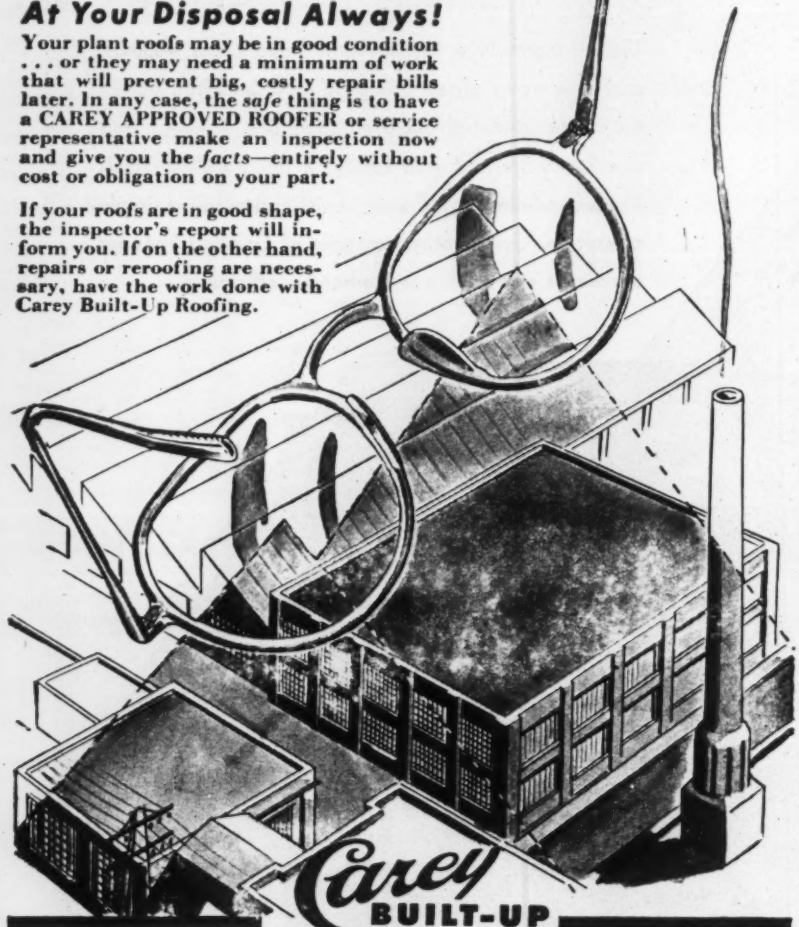

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POSTWAR PROJECTS (Cont'd.)

★**Minn., St. Paul**—City ... M. Rosen, ... P. Wks., City Hall ... paving exte... Snelling Ave. South to ... nection with ... St., **$191,000**; exten. Hud... Rd. from ... lish St. to connection ... with East Ke... Blvd. viaduct. **$996,000.**

N. Y., Kensington—... installing ... lage-wide curbing, $42,... **$90,000**; imprv. 3 mi. ... crete sidew... **$18,000.** State Aid Pla... Funds allo...

N. Y., Lancaster—To... J. E. Sch... superv., 27 Park Blvd. ... ft. East ... West Home Sts., **$6,000**; ... ft. pave... road, water line from ... Y.C.R.C. C... Bway., **$20,000.**

N. Y., Tupper Lake—V... reconst... ing Prospect, Lafayette ... Boeuf, W... Railroad and High Sts. ... McLaughlin ... Lakeview Aves., **$100,000**. ... State Aid F... ning Funds allotted.

Rhode Island—State D... Hys. & Bri... Providence, concrete ex... Nooseneck ... Rd. 1371, in Richmond ... Hope Va... **$50,000.**

S. C., Isle of Palms—P... Realty Co... Broad St., Charleston, ro... sidewalks, ... lic walks and drains, ... seashore re... **$150,000.**

Tex., Victoria—City, ... paving, drai... **$150,000.**

PLANS UNDER WAY

Ala., Montgomery—Montgomery Co., ... 90% completed 20 to 30 mi. bitumino... stabilized gravel surfacing. **$100,000.** ... rights not cleared. Thos. H. Edwards, ... 1414, engr.

Ariz., Kingman—Mohave Co., J. J. ... ningham, clk., Box 68, constructing ... walks, curbs, gutters, **$50,000**; black ... paved streets in Kingman, Oatman ... Chloride, **$20,000.** L. H. Foster, King... engr.

★**Conn., New Britain**—City, Wm. K... chn. Bd. P. Wks., City Hall, plans ... pleted resurfacing Main St., **$16,600**; w... ing, paving High, South High, Walnut ... Washington Sts. **$60,900**; paving Comme... St., **$6,000**; grading, paving Rocky Hill A... Davenport, LaSalle, Long, Short, Hamp... Sts., Reservoir Rd., **$220,900**; bitumi... macadam paving 20 streets, **$183,700**; ex... W. Pearl St., **$45,500**; cut backs, street ... ers, **$7,020.** Financing not provided for. ... Molleur, City Hall, engr. CD 3/18/... ENR 3/25/43.

Ill., Springfield—City, City Hall, p... 25% completed concrete paving and ... ing 3,920 ft. Springfield and in Woods... **$45,000.** M. L. Lush, city engr.

Ill., Watseka—Iroquois Co., H. E. Ge... land, supt. Hys., Watseka, plans 98% ... pleted grading, gravel or crushed stone ... facing and drainage structures 2 mi. S... 174-M.F.T. on State Aid Route 26, Ash... and Chebanse Twps., **$11,500**; plans ... completed 2.75 mi. Sect. 1-5-15D, on S... Aid Route 23, Ashkum and Danforth Tw... **$15,800**; plans 75% completed 6 mi. S... 173-M.F.T., on State Aid Routes 8-B ... 1-A, Douglas, Danforth and Ashkum Tw... **$32,000**; plans 20% completed 4.5 mi. S... 176-15D, on State Aid Route 8-B, Ar... Twp., **$23,500.** Iroquois Co. Higway D... Watseka, engr.

Ill., Winnetka—Village, plans 80% c... pleted opening Lincoln Ave. for 1 bl... through business dist. from Elm to Oak S... incl. aquisition of R.O.W., sewer, wa... electric street lights, concrete paveme... removing existing bldgs., altering remain... bldgs., **$128,000.** Land rights not clea... legal obstacles to be overcome. R. L. And... son, village engr.

Minn., Montgomery—City, F. Busta, c... City Hall, concrete paving about 40 bloc... Over **$75,000.** Hitchcock & Estabrook, ... Sexton Bldg., Minneapolis, consult. engr...

Minn., New Prague—City, G. J. Stee... clk., City Hall, concrete paving about ... blocks. Over **$90,000.** Hitchcock & Est... brook, 521 Sexton Bldg., Minneapolis, c... sult. engrs.

★**New Hampshire**—State Div. Hys., C... cord, surveys and plans started surf... treated graveling and concrete bridge ... mi. Rochester, **$100,100**; 0.28 mi. Lebo... **$155,100**; 0.19 mi. Lancaster, **$120,450**; ... mi. Dummer, **$162,250.** Financing not p... vided for.

N. Y., Ballston Spa—Comrs. Saratoga C... Ballston Spa., plans 80% completed gra... fdn., 2 mi. Road 64, **$28,000**; plans ... completed 4.5 mi. Road 63, **$54,000**; 2.6 ... Road 91, **$36,000**; 2.6 mi. Road 91, ... 6.1 mi. Road 21, **$72,000**; plans 55% c... pleted 1.8 mi. Road 104, **$24,000**; 1.5 ... Road 22, **$24,000**; plans 50% completed ... mi. Road 17, **$24,000**; plans 60% comple... bituminous macadam surfacing 5.2 mi. Ro... 91, **$24,000**; 1.6 mi. Road 17, **$7,500**; 4.5 ... Road 63, **$22,000.** Land rights not clea... F. Ray Williams, County Office Bldg., Sa... toga Springs, co. supt. hys. CD 4/20—E... 5/4.

N. Y., Batavia—City, City Hall, prelim... ary plans completed imprv. Pearl St. ... 000. A. O. West, City Hall, city engr. 12... —ENR 1/13.

N. Y., Binghamton—City, City Ha... plans 45% completed widening, relocati... reconstructing Upper Court St., **$200,0...** Financing not provided for. J. A. Gi... city engr. CD 3/2—ENR 3/25.

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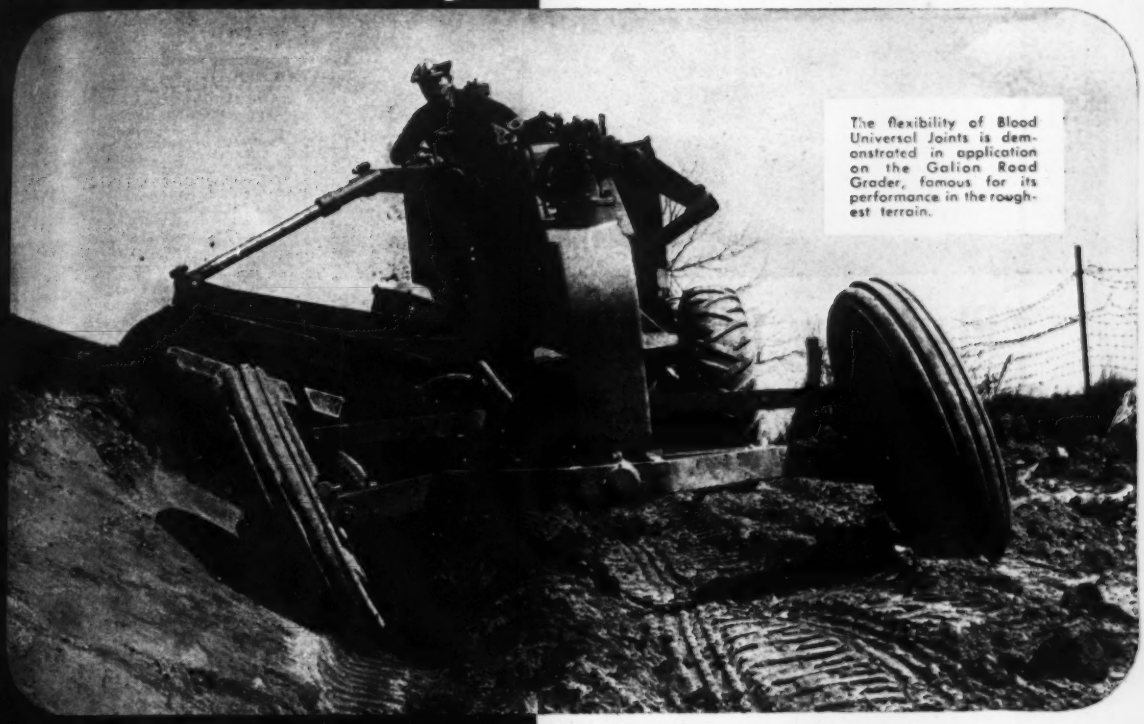

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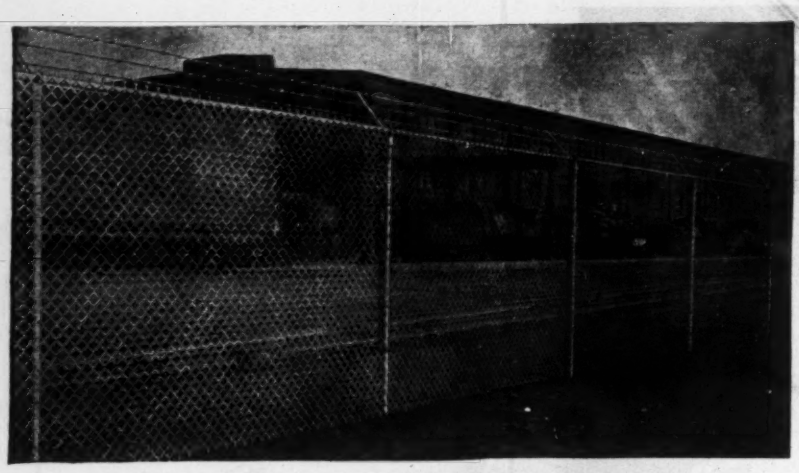

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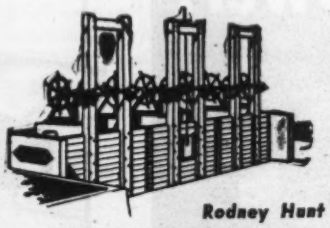

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POSTWAR PROJECTS (Cont'd.)

N. Y., Buffalo—Erie Co. Park Comm., Pearl St. Bldg., graveled road and bridle path, Chestnut Ridge Park, $26,000. A. B. Wea[ver], engr. CD 1/27—ENR 2/10.

N. Y., Canandaigua—Ontario Co., G. C[ar]ter, supt. Hys., Canandaigua, preliminary plans completed 10.5 mi. road improvement, $200,000. Engineering Staff, Ontario Co. Hy. Dpt. Court House, engr. CD 5/3—ENR 5/18.

★**N. Y., Fonda**—Monroe Co., Fonda, plans 60% completed bituminous macadam paving 0.7 mi. and bituminous macadam with shoulders paving, etc., 2.4 mi. road, $231,000; plans 40% completed bituminous concrete paving, curbing 4.4 mi., bituminous macadam paving, concrete guttering 4.4 mi. bituminous macadam paving with shoulders 37.2 mi. roads, $1,443,000. F. H. Carroll, 244 S. Plymouth, Rochester, dir. Wks. CD 8/16—ENR 9/7.

★**N. Y., Goshen**—Orange Co., Goshen, plans completed heavy macadam paving 1 mi. Orange Farm-Maple Ave. Rd., $18,300; medium macadam paving 2.5 mi. Tompson-Ridge-Hopewell Rd. 48 [illegible] land rights not cleared; plans 35% completed light macadam paving 5 mi. Washingtonville-Monroe-Woodbury Co. Rd. 50, [illegible]; plans 97% completed medium macadam paving 4.5 mi. South Centerville-County Rd. 1 to Rd. 46, $98,850; plans 75% completed [illegible] mi. Chester-Walton Lake Rd. 45, [illegible]; plans 40% completed 2.5 mi. Searsville-Colbar Rd., $58,250; plans 10% completed 5 mi. Edenville-Florida Rd. 41, $116,500. H. Inge Breed, Goshen, co. engr. CD 4/7—ENR 4/20.

N. Y., Grand View on Hudson—Village, E. Taylor, mayor, Village Hall, plans completed reconstructing, regrading hys., $[illegible]; curbing, guttering, $6,000. Financing not provided for. H. O. Polhemus, Rockland Theatre Bldg., Nyack, consult engr. CD 1/[illegible]—ENR 2/10.

N. Y., Great Neck—Village, T. H. Meade, Jr., clk., plans completed, highways $[illegible]; curbs $20,000, sidewalks $10,000. Financing not provided for. A. Piloff, Great Neck, consult. engr. CD 4/7—ENR 4/[illegible].

★**N. Y., Kingston**—Comrs., Ulster Co., Kingston, plans 91% completed 1 mi. Accord-Grante Rd., $25,000; plans 90% completed 2 mi. Esopus Rifton Rd., $30,[illegible]; plans 72% completed 2.2 mi. Clintondale-Crescent Ave., $35,000; plans 63% completed 3 mi. Brigg's St.-Ulster Heights Rd., $45,[illegible]; plans 62% completed 2.3 mi. Lucas Ave.-Cottekill-High Falls Rd., $69,000; plans 60% completed 1.2 mi. Ulster Landing-Flatbush Rd., $29,500; 1.6 mi. Hallihan's Hill-Sawkill Rd., $15,900; 1.6 mi. Hurley-Mountain Rd., $40,000; plans 55% completed 1.7 mi. De-Witt's Mills-Hurley Rd., $32,500; plans 20% completed 4.8 mi. New Paltz-Minnewaska Rd., $57,000; plans 25% completed improv. 4 mi. West Branch-Slide Mt. Rd., $47,[illegible]; plans 1.6 mi. Sand Hill-Gardiner Rd. $30,[illegible]; 1.2 mi. Shultis Corners-Rock City Rd., $32,000; 3.1 mi. West Saugerties-Rock City Shade Rd., $77,500; 1 mi. Upper Grand St. Extn., $10,000; 2 mi. Lew Beach-Turnwood Rd., $12,000; improv. 4 mi. Sundown-Peekamoose-West Shokan Rd., $40,000. J. F. Loughran, 74 John St., Kingston, co. supt. CD 4/28—ENR 5/4.

★**N. Y., Lockport**—Niagara County Hy. Dpt., R. Rumsey, supt. County Hys., 225-231 S. Niagara St., plans completed bituminous macadam paving 4.7 mi. Coomer Rd., Co. Rd. 46A, Pt. 1, Proj. 3965, $107,457; 2 mi. Cambria-Lockport Town Line and Lower Mt. Conn., Co. Rd. 114, Proj. 4070, $9,739; 2.2 mi. Creek Rd., Co. Rd. 112, Proj. 3968, $85,718; 1.10 mi. Grand Island Bridge Conn., Co. Rd. 115, Pt. 2, Proj. 430, $54,[illegible]; 2.25 mi. Slayton Settlement, Co. Rd. 28A, Pt. 2, Proj. 4077, $58,303; plans 90% completed 2.95 mi. Hartland Rd., Co. Rd. 108, Pt. 6, Proj. 420, $103,250; 3.25 mi. Orangeport Rd., Proj. 418, $113,750; plans 95% completed 1.15 mi. Drake Settlement, Proj. 417, $117,[illegible]; 2.4 mi. Lower Mountain Rd., Proj. 416, $[illegible],000; plans 75% completed 3.3 mi. Tonawanda Creek Rd., Proj. 421, $115,850.

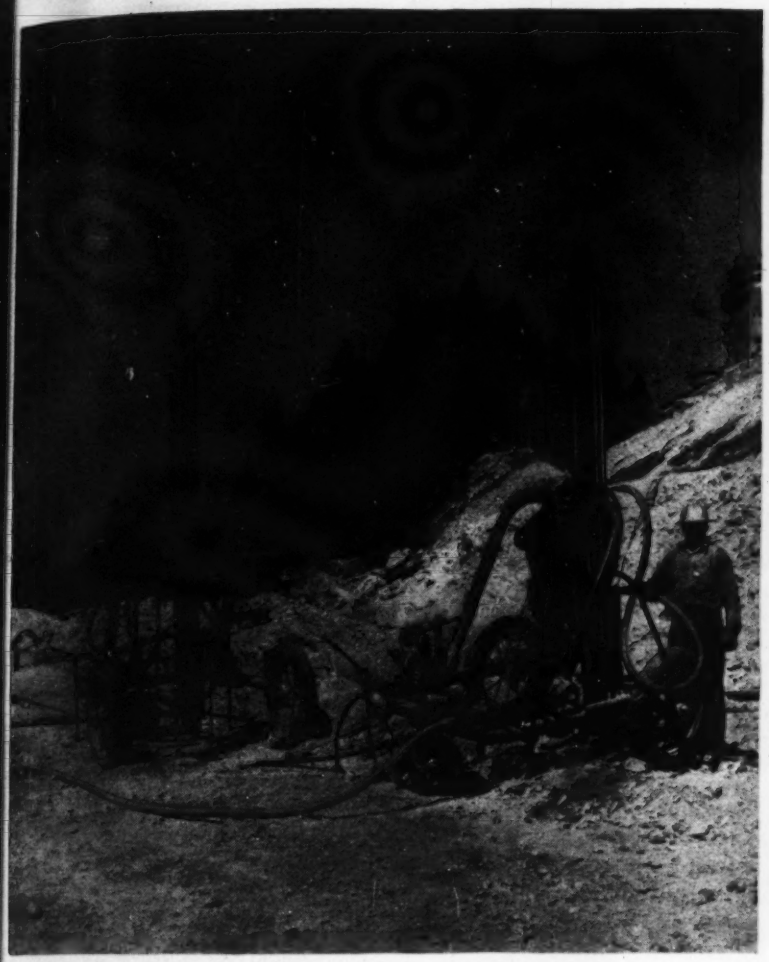
★**N. Y., Mount Vernon**—City, plans completed grading at incinerator, $30,[illegible]; impry. Devonia Ave. East, $21,000; North St., $30,000; Prospect Ave., $37,500; East Sidney Ave., $50,700; Hillside Ave., $34,[illegible]; North High St. between Putnam and William Sts., $35,400; E. 5 St. between Mundy Lane and Hutchinson Ave., $170,000; concrete sidewalks, $100,000. Financing not provided for. Chas. M. Hick, city engr. CD 4/7—ENR 4/20.

★**N. Y., New York**—Dpt. P. Wks., I. V. A. Huie, comr., Municipal Bldg., Zone 7, plans under way reconstructing Manhattan approaches to Willis Ave., 3 Ave., Madison Ave. and 145 St. bridges, PH-91. $945,[illegible]; R. H. Gould, engrs. CD 1/28—ENR 2/[illegible] under Bridges.

N. Y., Ogdensburg—City, repairing, reconstructing sidewalks throughout city, $45,[illegible]; realignment roadway, sidewalk and curbing Spring St. Bridge, $10,000. C. H. Lord, 4 Lafayette St., city engr.

N. Y., Oneonta—City, plans 80% completed paving West St. $35,000. Land rights not cleared, financing not provided for. F. X. Gurney, city engr. CD 4/7—ENR 4/20.

N. Y., Scarsdale—Village, R. Newsom, mgr., Village Hall, plans 60% completed widening, impry. 2 streets, $40,000. H. J. Fairbanks, Village Hall, engr. CD 4/28—ENR 5/4.



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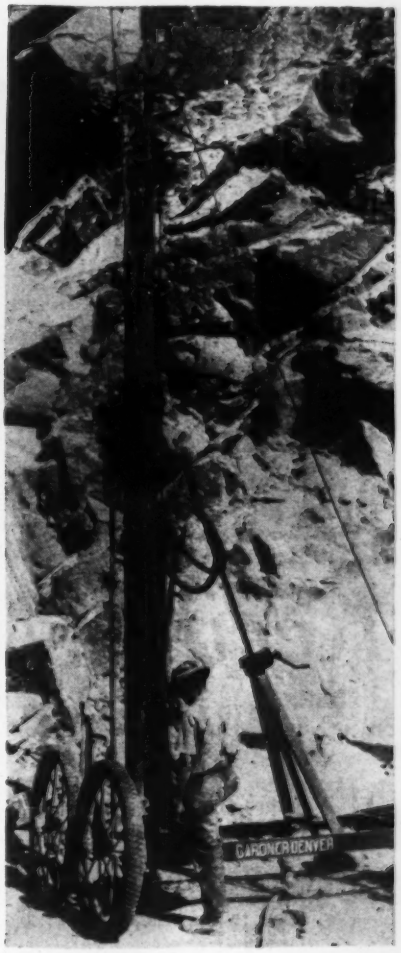

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POSTWAR PROJECTS (Cont'd.)

N. Y., Schoharie—Comrs., Schoharie Co., L. J. Wright, supt., Schoharie, preliminary plans 50% completed improv. 35 mi. roads, **$325,000.** Schoharie Co. Hy. Dpt., Schoharie, engr. CD 4/20—ENR 5/4.

★**N. Y., Syracuse**—City, plans 60% completed repaving streets, removing old disintegrated pavement and replacing same with new concrete base 8 in. deep and 3 in. sheet asphalt surface, adjusting curbs and catch basins, **$1,058,525.** N. [illegible] Pitts, city engr. CD 1/10—ENR 1/27.

N. Y., Warsaw—Village, L. H. Bishop, clk., Village Hall, plans nearing completion about 4 mi. streets, sidewalks. $160,000. H. Ten Hagen, Warsaw, consult. engr.

★**N. Y., White Plains**—Westchester Co., White Plains, plans completed rein.-con. reconstructing 2,000 ft. Saw Mill River Parkway, Hawthorne Circle pavement to North, 44 ft. wide, incl. removal 550 ft. pavement, **$52,000.** Financing not provided for; constructing 0.23 mi. Harmon Rd., incl. widening, existing 18 ft. rein.-con. pavement with concrete fdn. course, 2 in. bituminous resurfacing, concrete curbs, $31,900. Land rights not cleared and financing not provided for; plans 50% completed construcing 0.95 mi. Mamoroneck Ave. Sect. 1, Co. Rd. 8C, from Bryant to Ridgeway Aves., **$200,000;** 0.42 mi. Columbus Ave., Co. Rd. 64-2 from County Road 2.9 at Bridge over Bronx Parkway ext. northerly to Cambridge St. in Mount Pleasant, **$112,000;** plans 30% completed 1.01 mi. Mamaroneck Ave. Sect. 2, Co. Rd. 8-C, from Ridgeway to Rosedale Aves., **$200,000;** plans 25% completed 0.64 mi. Mamaroneck Ave. Sect. 3, Co. Rd. 8-C, from Rosedale Ave. to White Plains-Harrison Line, **$161,000;** plans 50% completed 8 in. rein.-con. paving 500 ft. access road to Yonkers Ave., Saw Mill River Parkway 806-B, **$60,000;** plans 75% completed 1,200 ft. access drive from McLean Ave. to Sawmill River Parkway, 806-E, **$200,000;** 200 ft. access drive from Saw Mill River Parkway to Marble Ave., at Thornwood, etc., 806-F, **$27,900;** plans 50% completed 3 in. bituminous macadam paving, etc., 4,500 ft. road at Grasslands from Saw Mill River Rd., SH 52 easterly to Grasslands Main Hospital Bldg., along in Mount Pleasant, **$30,000;** preliminary plans completed Saw Mill River Parkway repairs, imprvs., at Waterworks, Part I, removing, replacing wiring course on structures, Part II, alternate plans for retaining wall and fill or for trestle, structure under consideration, **$25,000.** C. A. Garfield, County Office Bldg., engr. CD 1/10, 1/12—ENR 1/27.

O., Athens—Comrs. Athens Co., Court House, road imprvs., **$147,300;** plans completed county and township road repairs, **$169,500;** rebuilding black top roads, $73,300. Financing not provide dfor. H. Dusz, Court House, engr.

★**Pa., Phila.**—City, City Hall, plans underway realigning, resurfacing, paving Fairmount Park drives, new footwalks, F.P. 45, **$120,000;** F.P. 46 **$120,000,** F.P. 47 **$125,000,** park drives, F.P. 43, **$120,000;** park drives, new footwalks, F.P. 44, **$125,000;** repaving, imprvs., sections Secondary Street Sys., Proj. WH 151-160, **$260,000;** Proj. WH 161-170, **$265,000;** Proj. WH 221-230, **$45,000;** Proj. WH 211-220, **$50,000;** Proj. WH 201-210, **$55,000;** Proj. WH 191-200, **$65,000;** Proj. WH 181-190, **$270,000;** Proj. WH 171-180, **$265,000;** Proj. WH 241-250, **$25,000;** Proj. WH 231-240, **$25,802;** widening, repaving tramway streets, Proj. WH-3, **$392,500.** T. Buckley, city engr.

★**Pa., Phila**—City, City Hall, plans 75% completed opening, widening, imprv. arterial hys., Proj. WE-545, **$5,500,000;** Proj. WE-547, **$5,500,000;** arterial hys., **$8,710,000;** Proj. WE-517, **$6,000,000;** plans 80% completed repaving, imprv. sections primary street sys., Projs. WH 134-150, **$547,320;** Projs. WH 121-133, **$360,000;** Projs. WH 108-120, **$390,000;** Projs. WH 95-107, **$375,000;** Projs. WH 82-94, **$370,000;** Projs. WH 69-81, **$350,000;** Projs. WH 56-68, **$340,000;** Projs. WH 43-55, **$335,000;** Projs. WH 151-161, **$125,000;** Projs. WH 31-42, **$350,000;** Projs. WH 18 to 30, **$350,000.** T. Buckley, City Hall, city engr.

★**Wash., Bellingham**—City Street Dpt., Bellingham, plans 20% completed imprv. streets, concrete paving **$471,200,** asphaltic concrete paving **$485,635.** State Hy. Dpt., Olympia, consult. engr. E. W. Gooch, 219 Lottie St., city engr.

★**Wyoming**—State Hy. Dpt., J. R. Bromley, supt., Cheyenne, plans underway grading, draining, surfacing, olling, bridges, 11 mi. Proj. 1, **$400,000;** 13 mi. Proj. 2, **$500,000;** 14.3 mi. Proj. 3, **$300,000;** 6.3 mi., secondary road, Proj. 10, **$150,000;** grading, draining, surfacing, oiling 8.5 mi. Proj. 4, **$450,000;** grading, draining, surfacing, olling 5 mi. secondary road, Proj. 8, **$85,000;** 3.5 mi. Proj. 9, **$110,000.**

READY FOR BIDS.

Ga., Brunswick—Comrs. Roads & Revenue, Brunswick, plans completed road paving, St. Simons Island, **$75,000.** H. J. Friedman, Court House, engr.-dir.

Ill., Watseka—Iroquois Co., H. E. Crossland, supt. Hys., Watseka, plans completed grading, gravel or crushed stone surfacing and drainage structures 5 mi. Sect. 172-M.F.T. on State Aid Route 30, Douglas, Danforth and Iroquois Twps., $35,000; 6.11 mi. Sect. 140-15D on State Aid Routes 19-B and 35, Iroquois Twp., **$61,000.** Iroquois Co. Highway Dpt., Watseka, engrs.

Salt-encrusted equipment at the Ohio Salt Co. plant at Wadsworth, Ohio. The tail-water pipe, spotlighted where it enters the shutoff valve and magnified at the right above, is Yoloy, furnished by Hardware and Supply Company, Akron, Ohio.

Portrait of Yoloy
Resisting a 3-Year Salt Attack

THIS Yoloy pipe has been in daily service in a corrosive salt atmosphere for over three years. It is the tail-water line handling condensate from the vacuum pan of a salt evaporator.

To the left you see the equipment "as is," encrusted with 3 years' accumulation of salt. Much of the piping, valves, tank, etc., is badly corroded.

Above is a closeup of the Yoloy pipe after the salt was removed. Note that it retains its perfection of threads, in fact, has the appearance of new pipe. That's because Yoloy is a nickel-copper steel, its remarkable ability to resist corrosion demonstrated in hundreds of instances like this.

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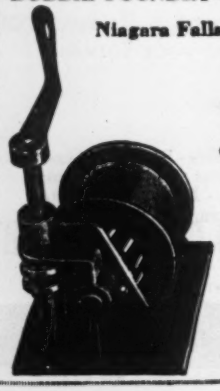

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POSTWAR PROJECTS (Cont'd.)

N. Y., Batavia—City, City Hall, plans completed bituminous macadam resurfacing East and West Main Sts., $93,000. A. D. West, City Hall, city engr. CD 2/25—ENR 3/9.

N. Y., Goshen—Orange Co., Goshen, plans completed macadam paving: 2.25 mi. Hugenot-Cahoonzie Co. Rd. 30, $90,100; 4.64 mi. Finchville-Smith Corners Co. Rd. 35, $117,000; 2.07 mi. Maple Ave.-Denton Smith Corners Co. Rd. 37, $27,650; 3.25 mi. Circleville-Bloomingburgh Co. Rd. 39, $87,600; 5.68 mi. Purdys Corners-Salisbury Mills Co. Rd. 27, $92,950; widening 47 ft. reinforced concrete Bridge, 26 ft. roadway and approaches, Morris, $12,000. N. R. Quackenbush, Orange Co. Hgwy. Dpt. engr.

N. Y., Scarsdale—Village, Reeves Newsom, mgr., plans completed widening imprvs. 3 roads, $98,200. H. J. Fairbanks, Village Hall, principal engr. CD 4/20—ENR 5/4.

CONTRACTS AWARDED

N. Y., Malone—Comrs. Franklin Co., F. S. Wright, supt., Malone, plans 50% completed reconstructing Bangor-Skerry Rd., $35,000; plans 25% completed Chasm Falls-Owls Head Rd., $60,000; plans 26% completed Merrils Corners-Hunters Home Rd., $60,000; plans 10% completed Irish Rd.-Constable, $75,000; plans Westville-Canadian Line Rd., $67,000; California Rd.-River Bend Rd., $50,000; Westville-Canadian Line Rd., $67,000; Owls Head-Mountain View Rd., $40,000; reconstructing Bombay-Hogansburg Rd., $35,000, own forces. CD 1/27—ENR 2/10.

★**N. Y., Norwich**—Comrs. Chenango Co., Norwich, plans completed constructing Proj. 41, Union Valley—Cooper School Rd., in Guilford and Oxford, $76,600; Spurr St.—Gould's Corners, in Columbus, $100,000; Norton Corner—McDonough Rd., in Preston and McDonough, $137,500; Smithville Center—Smithville Flats County Rd. in Smithville, $104,000; Miller's Corners—Lincklaen County Rd. in Lincklaen, $140,000; Pitcher Springs—Brackel Rd., in Pitcher, $87,000, own forces. Land rights not cleared and financing not provided for. E. B. Pendleton, 6 West Park Place, co. supt. hys. and engr. CD 1/27—ENR 2/10.

PROJECTS CANCELLED.

N. Y., Lyons—Village, City Hall, cancelled regrading village streets, $40,000. CD 4/7—ENR 4/20.

EARTHWORK, WATERWAYS

PLANS UNDER WAY

N. Y., Warsaw—Village, flood control, small streams, $20,000. H. Ten Hagen, Warsaw, consult. engr. CD 12/15—ENR 1/13.

★**O., Columbus**—Ohio Conservation Dpt., State Office Bldg., D. Waters, dir., plans under way headwater lakes, $6,000,000; stream imprvs., $6,000,000. P. Runkle, State Office Bldg., ch. engr.

O., Delaware—City, C. L. Owen, dir. P. Serv., plans under way imprv. Olentangy River water banks and constructing concrete dam. $35,000 bond election Nov. 7, for same.

★**Pa., Phila.**—City, City Hall, plans under way dredging, Proj. WH-2, $1,115,000. T. Buckley, City Hall, city engr.

READY FOR BIDS.

★**N. Y., Fonda**—Monroe Co., Fonda, plans completed area and highway drainage by altering 41.5 mi. channels and streams to provide necessary hydraulic capacity and to protect abutting private and public properties. $976,000.

PUBLIC BUILDINGS

PROPOSED WORK

★**Colo., Denver** — School Dist. 1, 414 14 St., Denver, remodeling Junior High School, incl. auditorium, 2 gyms, cafeteria, addnl. class rooms, $200,000; various school addns., $1,000,000.

★**Conn., Cheshire**—State Regional High School Dist. 2, Cheshire, high school, W. Main St., serving Cheshire, Bethany and Prospect. $500,000. 30 acre site purchased.

Conn., Glastonbury—Town, Glastonbury Library Assn., Hartford Conn. Trust Co., trustee, 750 Main St., Hartford, brick, stone Harriet Turner Burnham Memorial Library, $160,000.

Conn., Stratford—Town, W. Shea, mgr., Town Hall, brick, steel high school addn., for auditorium and gymnasium, $150,000; 1 story, brick, concrete maintenance bldg. addn., Town Yard. $40,000.

Ind., Noblesville—Hamilton Co., hospital, $150,000 or more with equip. Purchased 16 acre site.

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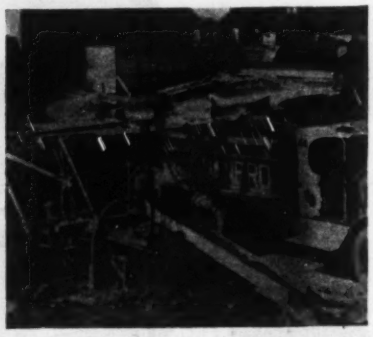

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POSTWAR PROJECTS (Cont'd.)

★**La., Baton Rouge**—Louisiana State University, Baton Rouge, bldg. expansion, imprvs., $[illegible]; Administration College of Education Lab. School, $350,000; bldg. for men's dormitory, $[illegible]; dining hall unit to Parker Dormitory for Women, $200,000; hospital wing, $225,000; dining hall unit to Highland Dormitory for Women, $225,000; gymnasium, over $[illegible]; paving, sidewalks, etc., over $25,000; drainage, university campus landscaping, grounds development, etc., over $25,000; water facilities exten., over $15,000; and sanitary sewerage sys. expan., over $25,000, for University Bldg. area.

Me., Augusta—City, R. G. Webber, chn. Planning Bd., City Hall, 2 schools, each. Financing not provided for. $150,000

Mich., Allegan—School Dist. 1F of Allegan Co., Allegan, bldg. $230,460.

★**Mich., Bay City**—School Dist. of Bay City, bldg. $600,000.

★**Mich., Flint**—Genesee Co., Flint, bldg. $700,000.

Mich., Huntington Woods—City, City Hall, 12775 First St., 2 story city office and community bldg. $150,000.

Mich., Jackson—Jackson Co., Jackson, bldgs. $270,481.

Mich., Litchfield—School Dist. 2 Litchfield Twp., Hillsdale Co., bldg. $275,000.

Mich., Midland—Midland School Dist., bldg. $225,000.

Mich., Plymouth—School Dist. 1F of Plymouth, bldg. $150,000.

Mich., Sturgis—School Dist. of Sturgis, 1 bldg. $350,000.

Mich., Tawas City—Iosco Co., Tawas City, bldg. $150,000.

★**Mich., Waterford**—Waterford Twp. School Dist. U, Waterford, 1 bldg. $750,000.

N. Y., Albany—Dpt. P. Wks., State Office Bldg., Zone 1, addn. for Dramatics & Music and altering boiler house, at Albany State Teachers College, for Dpt. Educ., Education Bldg. $257,000.

N. Y., Buffalo—Dpt. P. Wks., State Office Bldg., Albany, state office bldg. addn. $165,000.

★**N. Y., Cohoes**—Dpt. P. Wks., State Office Bldg., Albany, 2 new power plants at Champlain Canal and State Dam, Mohawk River. $2,500,000.

N. Y., Russell—Town, alterations, addn. to Knox Memorial High School, for Central School Dist. 1. $200,000. State Aid Planning Funds allotted.

★**N. Y., Vischer Ferry**—Dept. P. Wks., State Office Bldg., Albany, Zone 1, addn., construction at Vischer Ferry and Crescent Power Houses. $900,000.

★**O., Cleveland**—City, E. L. Worthington, dir. P. Welfare, City Hall, group 7 to 8 institutional bldgs., replacing present City Correction Farm. $4,000,000. Land rights not cleared and financing not provided for.

O., Damascus—Goshen Rural School Dist., E. Grise, pres., $150,000 bond election Nov. 7, high school.

R. I., Woonsocket—City, L. Farrin, supt. Schools, Woonsocket, brick, steel school. $200,000.

Tex., Columbus—Columbus School Bd., Columbus, $150,000 bond election soon, gymnasium and canteen.

Tex., Denton—Denton Independent School Dist., Denton, high school, etc. $150,000; Junior High School, $160,000.

★**Wash., Olympia**—School Bd., Olympia, 2 schools, 3 school addns. $750,000. CD 1/25/43—ENR 1/28/43.

Wash., Seattle—School Bd., City Hall administration bldg. addn. $200,000.

★**Man., Winnipeg**—City, Dr. P. H. T. Thoralkson, chn., City Hall, medical centre. $1,800,000.

N. S., Halifax—City, vocational school. About $250,000.

PLANS UNDER WAY

Calif., Ontario—City, preliminary plans by Allison & Ribble, Quinby Bldg., Los Angeles, and J. Dewey Harnish, assoc. archt., 212 E. B St., public library. $150,000.

Colo., Denver—School Dist. 1, 414 14 St., plans by W. Gordon Jamieson & R. Ewing Steffler, 818 12 St., 3 story brick, concrete Emily Griffith Opportunity School addn. $250,000.

★**Ind., Indianapolis**—Bd. School Comrss., A. G. Good, bus. dir., 150 N. Meridian St., plans by D. A. Bohlen & Son, 1901 Farm Bureau Bldg., Emerick Manual High School, $500,000. Site not selected. Land rights not cleared, financing not provided for.

Me., Bangor—State, H. C. Greenleaf, comr. Institutions, State House, Augusta, sketches by Crowell & Lancaster, 6 State St., 2 story, bsmnt., 39x206 ft., concrete, brick dormitory at State Hospital. Over $150,000. Financing not provided for. CD 1/17—ENR 1/27.

★**Me., Orono**—University of Maine, A. A. Hauck, pres., Orono, plans by Cromwell & Lancaster, 6 State St., Bangor, 2 and 3 story, bsmnt., 53x194 ft., and 40x60 ft., brick engineering bldg., concrete fdn. Over $500,000. Financing not provided for. CD 10/23—ENR 11/2.

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POSTWAR PROJECTS (Cont'd.)

Mass., Fitchburg—City Hall, plans by Steve... Riley, 45 Newbury St., ... maternity and pediatric ... hospital. $300,...

Mass., Grafton—Comm... chusetts, Dpt. Mental ... St., Boston, plans by ... Beacon St., Boston, br... State Hospital. $60,000.

★**Mass., North Grafton**—... Massachusetts, Dpt. ... Nashua St., Boston, ... James H. Ritchie & Asso... St., Boston, imprv., ... ward unit and service bldg., State Hosp... $600,000. Financing not provided for. H... den, Harding & Buchanan, 582 Park ... Bldg., Boston, consult. engrs. CD 2/... ENR 2/24.

Mass., Pittsfield—Comrs. Berkshire Co., ... East St., plans by J. M. Vance, 24 No... St., court house addn. Over $150,000. ... nancing not provided for.

Mich., Howell—State Administrative B... Lansing, plans under way power pla... brick, steel, rein.-con. bldg. for boiler ho... at State Institution. $200,000. Allied En... neers, Inc., Penobscot Bldg., Detroit, cons... engrs.

★**Mich., Ionia**—Michigan State Hospi... State Administrative Bd., Lansing, pl... by H. E. Beyster Corp., 3-135 General M... tors Bldg., Detroit, brick, steel, rein.-c... power house for state hospital bld... $715,000. CD 10/2—ENR 10/19.

★**Mich., Traverse City**—Traverse City St... Hospital, State Administrative Bd., La... ing, plans by Allied Engineers, Inc., I... Penobscot Bldg., Detroit, brick, steel, re... con. power plant for Michigan State Ho... tal bldgs. $750,000.

Mich., Verona — Verona School Dist., ... Verona, plans under way brick, stone, st... concrete district school. $300,000.

Mich., Warren—Warren Twp., Warr... plans under way twp. bldg. $288,960.

Mo., Kansas City—Pembroke-Country D... School, 51 St. and Ward Parkway plans ... Tanner & Mitchell, 310 Ward Parkway, h... school and administration bldg., $65,0... gymnasium, $70,000; Middle School, $35,0... Junior School, $35,000.

Mo., Slater—City, E. D. Riley, may... City Hall, power plant imprvs. $68,0... R. R. Howard, City Hall, city engr.

★**Mo., Webster Groves**—School Dist., ... Webster Groves, Bd. Educ., F. L. Wrig... pres., 42 Selma Ave., plans $700,000 bo... election auditorium-gymnasium, $285,0... High school, athletic field, $50,000; Doug... School, $230,000; Goodall School addn., $7... 000, etc. Wm. B. Ittner, Inc., 403 B... Education Bldg., 911 Locust St., St. Lou... Zone 1, archt.

★**N. Y., Batavia**—Bd. Educ., W. Main S... preliminary plans completed by J. ... Kideney, 1344 Prudential Bldg., Buffa... Zone 2, schools, $325,000; high scho... $600,000; altering high school, $200,000. F... nancing not provided for. CD 8/2—EN... 8/24.

N. Y., Lockport—Clerk, Bd. Super... Niagara Co., Lockport, preliminary pla... completed enlarging 2 story brick Niaga... Co. Infirmary, $150,000. Chas. Thiele ... Chas. Obenhack, Niagara Falls, and L. ... Wendel, 33 Morrow Ave., assoc. archi... engrs. CD 3/16—ENR 4/6.

N. Y., Mount Vernon—City, plans ... completed by Alexander D. Crosett & A... sociates, 512 5 Ave., New York, Zone ... fire house, $163,000; plans 80% complet... fire house, 211 S. 4 Ave., $104,000. Financ... not provided for. Chas. M. Hick, city eng... CD 3/9—ENR 3/23.

★**N. Y., Mount Vernon**—Mount Vern... Housing Auth., Mrs. William Low Ro... man, chn., City Hall, plans 10% complet... by Alexander D. Crosett & Associates, 1... 5 Ave., New York, Zone 18, public housi... $4,500,000. Financing not provided for.

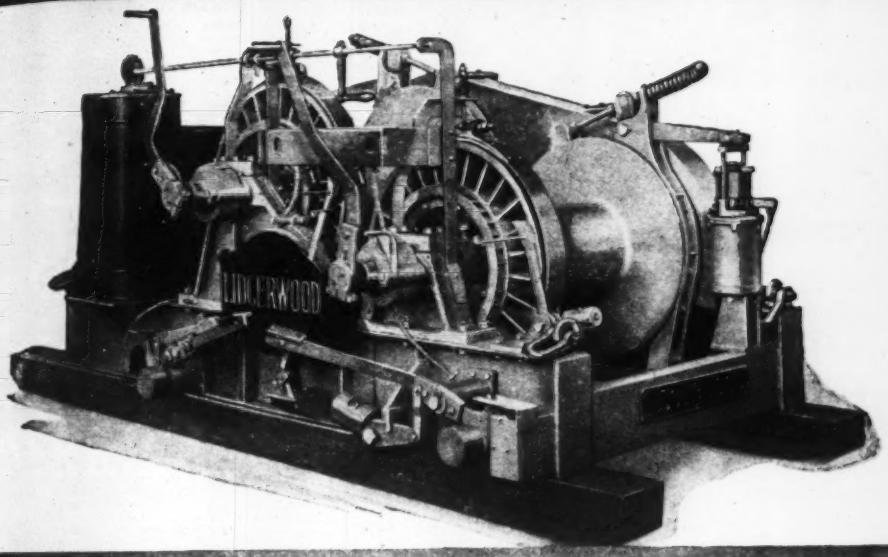
★**N. Y., New York**—Dpt. P. Wks., ... V. A. Huie, comr., Municipal Bldg., ... Zone 7, plans under way reconstructi... power house on Harts Island, for Dpt. ... Correction, 100 Centre St., C-2. $585,0... R. H. Gould, engr. CD 1/29/43—ENR 2/4/...

N. Y., New York—Dpt. P. Wks., L. V. ... Huie, comr., Municipal Bldg., Zone 7, plan... under way barracks for workhouse prison... ers, C-35, $192,950; new elevator in hosp... tal, C-40, $43,000; soap plant, C-32, $7,500... lift from bsmnt. in laundry bldg., $6,250... at Rikers Island, for Dpt. Correction, 1... Centre St. R. H. Gould, engr. CD 1/21... ENR 2/10.

N. Y., Scarsdale—Village, Reeves New... som, mgr., plans 75% completed by H. ... Webb, 101 Park Ave., New York, villag... hall, $200,000; plans 50% completed ... Hunter McDonnell & A. C. Githens, asso... archts., 101 Park Ave., New York, librar... $125,000. CD 11/24—ENR 12/2.

★**N. Y., Springfield Gardens**—Bd. Educ., ... 40 Flatbush Ave. exten., Brooklyn, Zon... 1, plans by H. Leslie Walker, 52 Vande... bilt Ave., New York, Zone 17, P.S. 1... vicinity of New York Blvd. and 137 Ave... Proj. E-81, $660,000. CD 2/15/43—EN... 2/18/43.

When Men's Lives Hung on a "Dead-Man's Lever"



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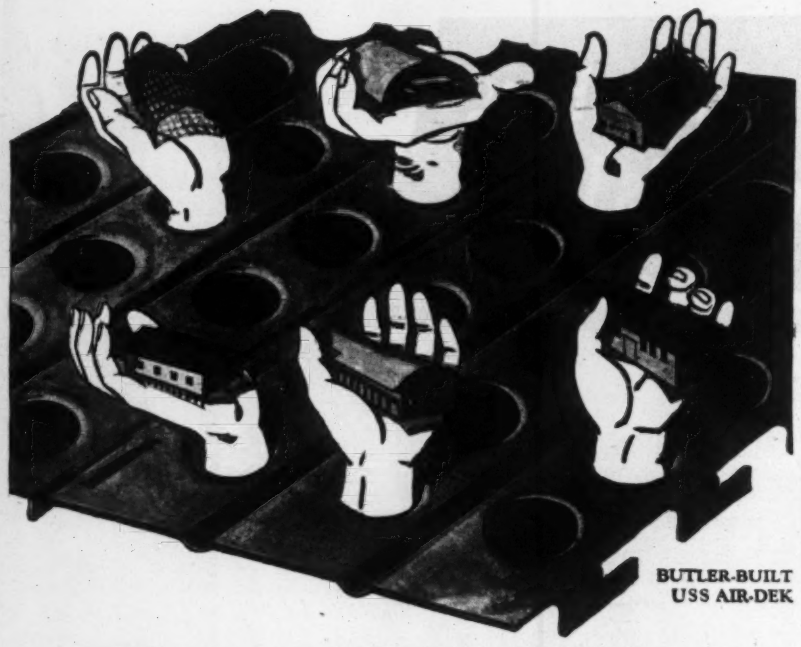

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POSTWAR PROJECTS (Cont'd.)

N. Y., Syracuse—City, City Hall, 1 story, brick, steel gymnasium and shop bldg. annex, concrete fdn. Vocation High School with connecting corridor to main bldg., $250,000; steel, brick centralized repair shop, concrete fdn., $133,000. N. F. Pitts, City Hall, city engr. CD 1/27—ENR 2/19.

N. Y., White Plains—Westchester Co., White Plains, plans 25% completed by Stohldreier & Zetsche, 175 Main St., central maintenance bldg., Grasslands Hospital, $55,000. C. A. Garfield, County Office Bldg., engr.

★**O., Cleveland**—Parmadale Boys' Home, Wm. R. Doley, pres., State Rd., sketches by G. S. Rider Co., Terminal Tower, dormitory, home for aged, and chapel. Financing not provided for. $2,000,000.

O., Youngstown—Mahoning County Tuberculosis Sanatorium, plans by C. Rousseau, Mahoning Bank Bldg., alterations, additions to Mahoning County Tuberculosis Sanatorium, $218,500. CD 6/7—ENR 6/15.

★**Pa., Phila.**—City, City Hall, plans under way asphalt plant, Proj. WH7, $176,000; 1 story, garage and 1 story stable at G and Romona Sts., WH9, $621,500; 1 story garage, Glenwood and Diamond Sts., WH11, $150,000; 2 story warehouse, 27 and Master Sts., $150,000; 2 story garage and shop and 1 story stable Bartram incinerator, WH4, $1,055,500; 1 story garage and 1 story stable, 1204 E. Montgomery Ave., WH10, $243,200.

R. I., Lafayette—State and Providence Plantations, Social Welfare Div., 40 Fountain St., Providence, plans by O. W. Fontaine, 285 Main St., Woonsocket, brick, steel, stone employees dormitories, State School, $250,000. CD 11/12—ENR 11/18.

R. I., Providence—State and Providence Plantations, Social Welfare, Dpt., 40 Fountain St., plans by Jackson, Robertson & Adams, 1216 Turks Head Bldg., brick, steel, stone state school, concrete fdn. $200,000.

Tex., Borger—Bd. Educ., City Hall, plans 5% completed by M. O. Carder, Fisk Bldg., Amarillo, Senior High School, $350,000. Site purchased.

★**Tex., Dallas**—State Fair of Texas, Fair Park, plans by W. Ahlschlager, 212 S. St. Paul St., and Fooshee & Cheek, assoc. archt., 1901½ N. Harwood St., livestock bldg., incl. large arena, auditorium, $1,000,000. CD 6/2—ENR 6/15.

★**Tex., El Paso**—College of Mines & Metallurgy, El Paso, plans 10% completed by P. McGhee, 1st National Bank Bldg., rein.-con., stucco, Tibetan architecture Fine Arts Bldg., $175,000; 1,200 seating capacity auditorium, $150,000 or more; plans under way students union bldg., $150,000; plans rein.-con. outdoor swimming pool, $30,000; landscaping, etc., for campus area, incl. hard paving, concrete sidewalks, grading grounds development, drainage, etc., over $25,000; water facilities in campus area over $15,000; sanitary sewer facilities expan. over $25,000.

Tex., Gonzales—Gonzales School Bd., Gonzales, plans by J. M. Marriott, 220 Frost Bank Bldg., San Antonio, schools, $150,000.

★**Tex., Velasco-Freeport-Clute** — Brazos Court Independent School Dist., G. M. McCranahan, Lake Jackson (near Freeport), plans by A. B. Dow, 2209 Commerce Bldg., Houston, high school, $250,000; school, $200,000; intermediate school, $150,000.

Wash., Bellingham — City, City Hall, plans by Naramore & Associates, Dexter Horton Bldg., Seattle, concrete, stone library, $290,000. E. W. Gooch, 210 Lottie St., city engr. CD 9/28—ENR 10/15.

Wash., Bellingham—City Park Dpt., City Hall, 6 park bldgs., replacement, 7 bldgs., $174,480. E. W. Gooch, 210 Lottie St., city engr.

Wyoming—State Hy. Dpt., J. R. Bromley, supt., Cheyenne, plans under way 4 maintenance shops. $150,000.

Alta., Calgary—Municipality, library, $300,000. J. R. Wood, City Hall, engr.

Ont., London—Bd. Educ., Dr. L. Cargill, chn., plans by L. E. Carrothers, c/o owner, 3 story, brick addn. to London Technical School, $250,000. CD 2/18—ENR 3/9.

READY FOR BIDS.

Calif., Pasadena—Bd. Educ., Pasadena, plans completed by R. Bennett, 6 Westmoreland Pl., 2 story, rein.-con. student union bldg., heating and ventilating sys. $210,000.

O., Dayton—Bd. Comrs. Montgomery Co., Dayton, plans completed by R. T. Parish, N. B. Bldg., chronically ill hospital at County Home, $150,000.

PROJECTS CANCELLED.

N. Y., Syracuse—City, City Hall, cancelled construction school shop and warehouse, $80,000. CD 1/27—ENR 2/10.

COMMERCIAL-BUILDINGS

PROPOSED WORK

★**Conn., East Hartford**—Farmers Cooperative Auction Assn., 89 Church St., auction plant, storing, handling. $300,000.

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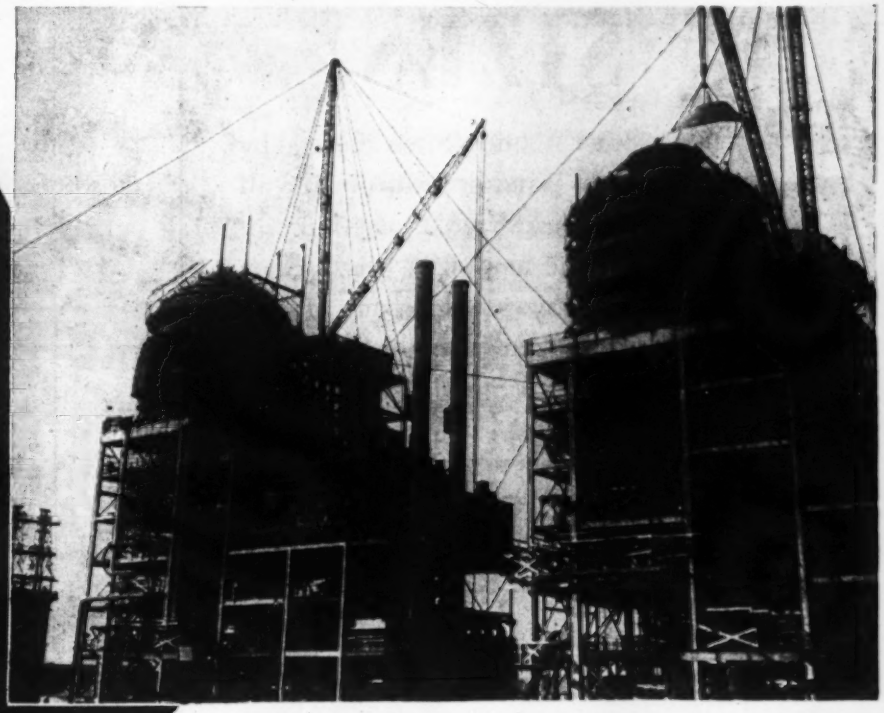

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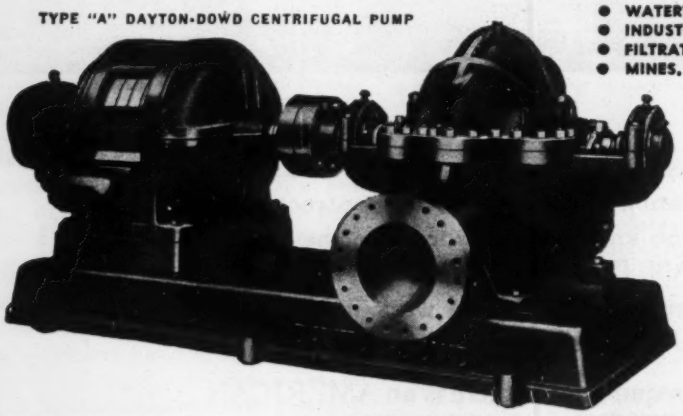

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POSTWAR PROJECTS (Cont'd.)

★**Conn., Hartford**—R[econ]struction Dev[elop]ment Co., 52 V[anderbilt] Ave., N[ew] York, N. Y., 2 story [addition] apartment, slum clearance housing, [various] sites to be determined, **$10,000,000.**

Ill., Jacksonville—Ma[cMurray College], C. McClelland, pres., brick, concrete, st[one] chapel. **$200,000.**

Mich., Kalamazoo — [Bronson Method]ist Hospital, Kalamazoo, brick, steel, stone, [con]crete hospital addn. $275,000.

Mich., Traverse City—[James Decker Ma]son Hospital, Traverse [City], 2 story brick, steel, rein.-con. hospital addn. **$400,000.**

Mo., St. Louis—Masonic Home of Miss[ouri], 5351 Delmar Blvd., cottages housing chil[dren's] div. of home on site fronting [1]ft. on Union Blvd., and 4[1]ft. on Enri[ght] Ave. Over **$150,000.** Site purchased.

N. C., Guilford College—Guilford Colle[ge], C. A. Milner, pres., new science bldg., women's residence, Memorial Hall addn. and renovating Cox Hall. **$350,000.** Drive on for funds.

Okla., Tulsa — Griffith Amusement C[o.], Insurance Bldg., Oklahoma City, Zone theatre, 120 South Main St. **$175,000.**

Ore., Pendleton—Columbia Conferenc[e] Seventh Day Adventist Church, 1311 Gar[field] land Ave., Spokane, Wash., academy for [1]students of high school age. **$250,000.**

Pa., Coatesville—Presbyterian Church, Coatesville, 2 story, bsmnt. auditorium church. **$150,000-$200,000.** Funds being raised.

S. C., Isle of Palms—Palm Realty Co., Broad St., Charleston, 100 residences at sea shore resort, **$300,000.**

Tex., Austin—Texas State Convention, B'nai B'rith, c/o H. L. Kaplan, 1012 Pacific St., Dallas, student bldg., at State Uni[ver]sity. Over **$150,000.**

★**Tex., Dallas**—American Legion, c/o Post 53, Fair Park and c/o R. B. Humphrey, Downtown Bldg. Com., 701 Dallas National Bank Bldg., 20 story office bldg. **$2,000,000.**

Tex., Dallas—L. Hexter & F. McNeny, 1215 Main St., shopping center, Cedar Spring Rd. at Lovedale. **$300,000.** Site purchased.

Tex., Dallas—Park Cities Baptist Congregation, c/o Dr. Alton Reed, 4201 Lover Lane, church. Over **$150,000.**

Tex., Dallas—Scott-Burr Corp., 420 Randolph St., Chicago, Ill., 5 story, brick, steel, concrete, department store, W. Jefferson and Madison Sts. **$250,000.** Site purchased.

Tex., Fort Worth—Texas Wesleyan College, Fort Worth, dormitory, over $150,000; auditorium-library, over **$150,000.**

★**Tex., Georgetown**—Southwestern University, Georgetown, library, over $150,000; administration bldg. expan., over $150,000; women's dormitory, over $150,000; men's dormitory, over $150,000. CD 2/17—ENR 3/9.

Vt., Montpelier—Heaton Hospital, Seminary Hill, brick, steel hospital unit. Over **$150,000.**

Que., Quebec City—Kresge's, Ltd., St. John St., store exten. **$150,000.** Site purchased.

Que., Quebec City — Metropolitan Chain Stores Co., Ltd., St. Joseph St., department store. **$150,000.** Site purchased.

PLANS UNDER WAY

★**Calif., San Francisco**—I. Magnin & Co., Geary St. and Grand Ave., preliminary sketches made by T. L. Pflueger, 580 Market St., 9 story, marble, granite department store, completely air-conditioned. Approx. $1,000,000.

La., Alexandria — Alexandria Diocese, Bishop D. F. Desmond, plans under way for bed catholic hospital. **$300,000.** Financing not provided for.

Md., Hyattsville—St. Jerome Catholic Church, Hyattsville, plans by Ross & Walton, Hyattsville, 2 story, bsmnt. brick, steel, concrete school. **$160,000.**

Mich., Detroit (Gratiot Twp.)—Wister & Westman, c/o C. N. Agree, archt., 1140 Book Bldg., Detroit, plans under way 120x240 ft., brick, steel, rein.-con. theatre, steam heating plant, **$300,000.**

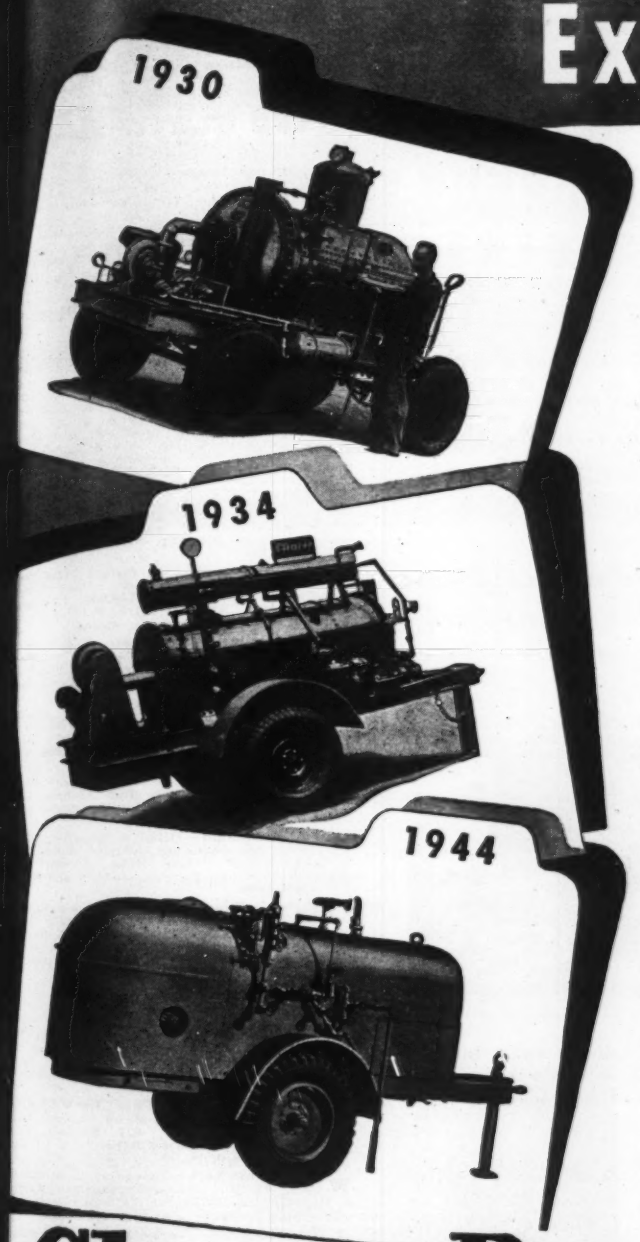
Mich., Muskegon—Mercy Hospital, Muskegon, plans by Jensen & Keough, 15875 Jas. Couzens Highway, Detroit, brick, steel, concrete hospital addn. **$150,000.**

N. J., Bordentown—Bordentown Military Academy, Bordentown, plans 10% completed by Ballinger Co., engrs.-archts., 105 S. 15 St., Phila., Pa., brick, concrete, steel school bldgs., armory. **$200,000.**

N. Y., New York—St. Paul's Evangelical Lutheran Church, 1986 Crotona Ave., Zone 57, plans completed by Cherry & Matz, 16 E. 50 St., Zone 22, church, parsonage, church offices and parish hall, McGraw and Virginia Aves. Over **$150,000.** Financing not provided for. CD 3/31—ENR 4/20.

★**N. C., High Point**—Southern Furniture Exposition Bldg., High Point, plans by Voorhees & Everhart, High Point, 10 story bldg. addn., incl. restaurant, club room, etc. Over **$500,000.**

YEARS OF SPECIALIZED EXPERIENCE • •



— An Advantage That Has No Substitute In The Design and Construction of Mobile Heating Equipment

THE familiar expression "there is no substitute for experience" is exemplified in the trim, streamlined, highly perfected Cleaver-Brooks Tank Car Heater of today.

It shows unmistakable evidence of being the product of years of specialized experience dating back to the pioneer model of fourteen years ago. At the time this unit quickly replaced cumbersome "boilers" — set a high standard of speed and efficiency in heating bituminous material in tank-cars. Most of these original Cleaver-Brooks units are still in service—a real testimonial to inherently sound design and construction.

Experience counts — it is one of many reasons why Cleaver-Brooks is the best known name in mobile heating equipment. No other equipment equals Cleaver-Brooks in providing steam—with less fuel and water—no other equipment has the original and exclusive four pass down-draft flue travel and integral fuel-oil burner construction, plus the *perfected* positive dry-coil method of condensate return, which ends the "water-wagon" problem.

Get complete information now—send for bulletins or see your Cleaver-Brooks distributor.

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PIONEERS AND ORIGINATORS OF

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS

Most Work-*able* Dipper by a Damsite — *or Anywhere Else*

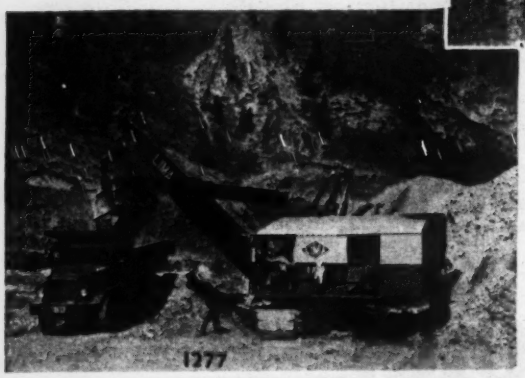
Three purposes are to be served by the Anderson Ranch Dam in Idaho. In addition to flood control, the dam and power plant will supply 500,000 acre feet of water storage and 30,000 KW of hydro-electric power to the Boise Valley.

The site is in a precipitous granite canyon on the South Fork of the Boise River, seven miles from the nearest existing highway. A mountain separated the site from the closest major borrow pit from which fill material could be obtained, making tunneling necessary. The job included 13,000,000 cubic yards of excavation and 7,500,000 cubic yards of earthfill.

One of the shovels employed on this project is shown in picture 1277—a Lima Type 1201 equipped with a 3½ yard Amsco manganese steel renewable lip dipper.

With an Amsco renewable lip dipper on his shovel, the operator knows that he has one designed for fast digging, full loading and quick, clean dumping. He also knows that manganese steel construction is insurance against breakage and rapid wear. The renewable lip feature is another factor of obvious convenience and economy.

Ask for Bulletins 641-D and 641-S on Amsco power shovel dippers and parts.



Above: Amsco renewable lip dipper as made for Lima shovels.

Left: Amsco 3½ yd. renewable lip dipper on Lima power shovel loading earthfill for the Anderson Ranch Dam.

Amsco "Conservation Welding Rods" described in Bulletin 941-W.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

AMERICAN Brake Shoe COMPANY

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

POSTWAR PROJECTS (Cont'd.)

★**O., Cleveland**—Marvin ... Housing Corp., c/o M. Welensky, Pub... Square Bldg., plans 25% completed one-hundred 1 family brick, frame dwellings. ...000,000. Sites purchased.

★**O., Cleveland**—S. Zehm... 1915 Powell Rd., plans 25% comple... ninety-five 1 family brick, frame dwe... $935,000. Site purchased.

O., Toledo—Eagles Lodge, ... 444 Erie St., plans under way 3 story Eagles Home addn., $175,000.

★**Okla., Midwest City**—Allied Home Builders, Inc., Apco Tower Bldg., W. P. Atkinson, pres., Oklahoma City, plans by Allied Architects, Inc., Colcord Bldg., Oklahoma City, 1,000 homes on ... acre tract adjacent to Midwest City. $8,000,000. Financing not provided for. R. V. Becker, 2735 N.W. 17 St., Oklahoma City, engr.

Pa., Chambersburg—Chambersburg Hospital, R. C. Gordon, genl. supt., plans 25% completed by Ballinger Co., engrs.-archts., 105 S. 12 St., Phila., Pa., brick, concrete, steel bldg. $150,000.

★**Pa., Harrisburg**—Harrisburg Junior Chamber of Commerce, c/o M. H. Patterson, archt., 213 Montrose St., Civic Arts Bldg., incl. large auditorium seating between 2,500 and 3,000 persons and 700 seating capacity auditorium, $1,000,000. CD 10/5—ENR 10/19.

Pa., Lemoyne—Trinity Lutheran Church, R. E. S. Frey, pastor, Lemoyne, plans 90% completed by Wenner & Fink, 1701 Arch St., Phila., church, Sunday School auditorium, $150,000.

★**R. I., Providence**—Miriam Hospital, 20 Parade St., sketches by Barker & Turner, 1022 Grosvenor Bldg., and Curtis & Riley, consult. archts., 45 Newbury St., brick hospital, concrete fdn., Summit Ave. and 6 St., $500,000. CD 4/21—ENR 5/4.

★**Tex., Dallas**—Baylor University (Memorial Hospital), 3301 Junius St., plans by A. E. Thomas, 307 Construction Bldg., 12 story main bldg., 5 story wings, Dentistry and School of Nursing, $1,650,000. CD 6/29—ENR 7/13.

★**Tex., Dallas**—W. W. Caruth, 1215 Main St., shopping center or village, Lovers Lane and Inwood Blvd. $750,000. Purchased 80 acre site. Hare & Hare, Sophian Plaza, Kansas City, Mo., consult. engrs.

★**Tex., Dallas**—J. S. Lesser & A. Hudson, Praetorian Bldg., plans 10% completed by G. Gill, Great National Life Bldg., 26 story, 650 room hotel, air-conditioned, and garage, etc. $6,250,000.

★**Tex., Dallas**—J. O. Lambert, Jr., and R. Hicks, Majors, 4401 Alto Loma St., plans 50% completed tourist hotel, Kessler Park, Plymouth and Hampton Rds. $500,000. Site purchased.

Tex., Houston — West University Place Baptist Church, Auden and Amherst Sts., plans 50% completed 3 story, gothic type church. $200,000.

★**Va., Richmond**—Miller & Rhoades, 517 E. Broad St., plans by Carneal, Johnston & Wright, Atlantic Life Bldg., 4 and Main Sts., 12 story department store, 6 and Broad Sts. $500,000.

Que., St. Hyacinthe—Rev. Peres, Dominicanis, 5375 Notre Dame de Grace Ave., Montreal, plans by L. Mainguy, 105 Cote de La Montagne, Quebec City, two 3 story, 35x136 ft. and 40x104 ft. rein.-con. wings retreat house. About $175,000.

READY FOR BIDS.

N. Y., New York — A. S. Cantoni, 551 Fifth Ave., Zone 17, plans completed by B. W. Whinston, 465 Lexington Ave., Zone 17, 6 story, 75x125 ft. apartment, Riverdale Ave., near 235 St. $175,000.

N. Y., New York—East River Savings Bank, 26 Cortlandt St., Zone 7, plans completed by E. Palmer, 624 Madison Ave., Zone 22, 6 story, apartment, 1674 to 1686 York Ave. $370,000.

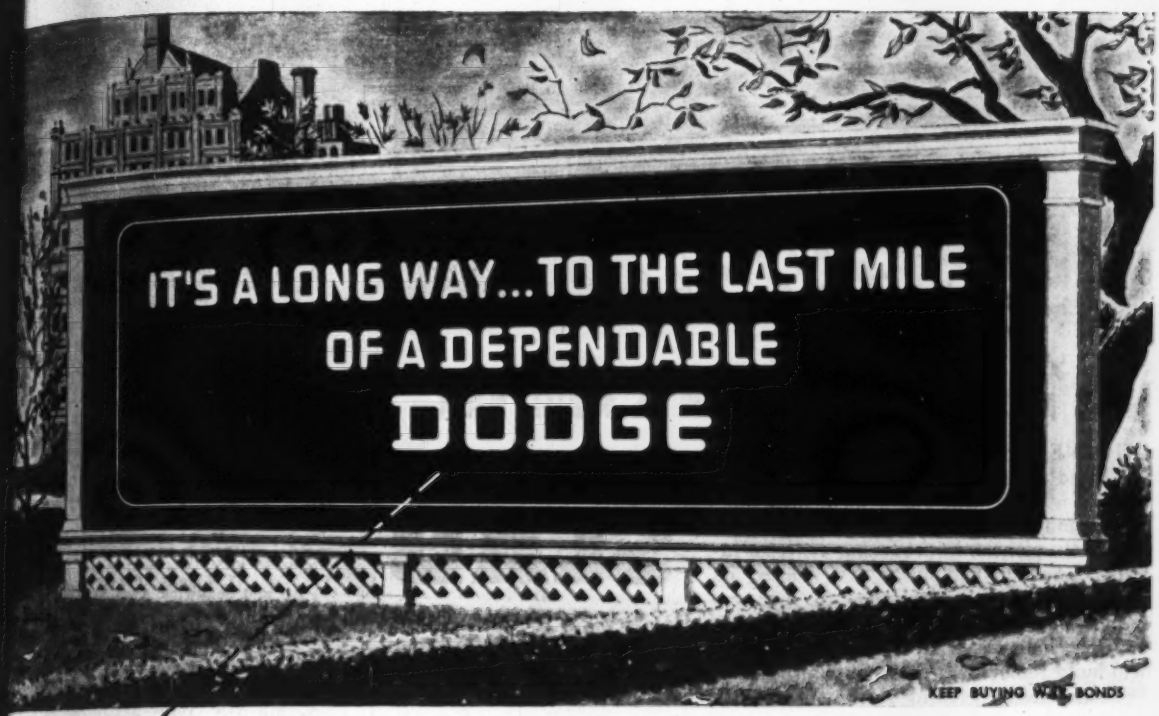
★**N. Y., New York**—Estate of R. V. Goelet, 18 E. 48 St., plans completed by Walker & Gillette, 18 E. 53 St., 12 story store and office bldg., 589-91 Fifth Ave. $1,300,000.

★**N. Y., New York**—Franklin Savings Bank, 8 Ave. and 42 St., Zone 18, plans completed by H. I. Feldman, 415 Lexington Ave., Zone 17, 16 story apartment, 301-303 W. 51 St. and 851-865 8 Ave., $1,110,000.

★**N. Y., New York**—J. Freidus & S. E. Aaron, 45 Crosby St., Zone 12, plans completed by M. Wechsler, 103 Park Ave., Zone 17, 6 story apartment bldgs. at 200-206 E. 20 St., $150,000; 503-509 E. 82 St., $160,000; 126-136 W. 61 St., $210,000; 328-332 E. 70 St., $130,000.

★**N. Y., New York**—Gerry Estates, Inc., R. L. Gerry, pres., 270 Bway., Zone 7, plans completed by F. W. Monckmeyer, 299 Bway., Zone 7, 19 story office bldg., 108-112 W. 41 St. $760,000.

★**N. Y., New York**—Gerry Estates, Inc., 270 Bway., Zone 7, plans completed by J. B. Snook Sons—V. C. Farrar, 299 Bway., Zone 7, 18 story, penthouse 150x200 ft. apartment, Third Ave. blockfront from 61 to 62 Sts., $2,500,000.



"Truer words were never spoken"

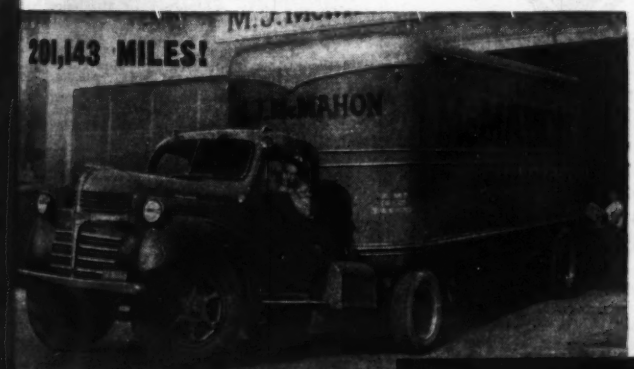
SAYS M. J. McMAHON
CONTRACT HAULER

". . . that's been *my* experience," continues Mr. McMahon, Illinois owner of a fleet of Dodge trucks. "I can't imagine trucks giving any more satisfactory service than I've had from my Dodge *Job-Rated* trucks.

"The truck in the enclosed photograph has run 201,143 miles to date, and has given perfect satisfaction. And, believe it or not, we had one Dodge that piled up 365,000 miles before the bottom pan was taken off.

"High mileage doesn't seem to 'faze' these trucks, and I ought to know, because my Dodge trucks have piled up plenty of miles, and 'tough' miles, too!"

Mr. McMahon is a contract hauler. Trucks are his "bread and butter." Yet he's only one of many owners—in all types of business—who have written that Dodge Job-Rated trucks are piling up 200,000—300,000—yes, half a million miles of dependable, low-cost transportation. In every industry, wartime hauling has proved that trucks that fit the job—last longer!



DODGE DIVISION OF CHRYSLER CORPORATION

NEW TRUCKS AVAILABLE. . . . The Government has authorized a limited number of new Dodge Job-Rated trucks for civilian hauling. See your Dodge dealer at once for trucks to fit your job. See him, too, for dependable truck and car service by trained mechanics using factory-engineered parts!

TUNE IN MAJOR BOWES, CBS, THURSDAY, 9 P.M., E.W.T.

4,000 U.S. COMMUNITIES DEPEND *ENTIRELY* ON TRUCKS FOR FREIGHT TRANSPORTATION!

DODGE *Job-Rated* TRUCKS
FIT THE JOB . . . LAST LONGER

A NEW MACHINE FOR A NEW ERA

ENGINEERS know that a period of unparalleled construction activity begins when Victory is won. But plans, methods, equipment can't wait for the final gun. Viber Company, pioneer in producing concrete internal vibration equipment, has slanted its research and experimentation to the new specifications of postwar. One such development is the VIBER SLAB, a multiple, high-speed internal concrete vibrating machine specially designed to help build tomorrow's heavy-duty airport runways, aprons, highways.

VIBER SLAB

Tests already performed definitely reveal: (1) VIBER SLAB will vibrate the stiffest concrete on slabs as fast as it can be economically placed on the sub-grade. (2) The battery of "Vibers" will vibrate the ENTIRE DEPTH *(not just the top surface)* of super-thick slabs. (3) Viber's "Viber-ation" in low slump concrete slabs produces strengths not now obtainable with present day equipment, and at a new low cost not now approached.

Expect big things of VIBER SLAB . . . a new machine for a new era!

The new SLAB is a development based on the superior performance of famous VIBER vibrators.

In the field for years, VIBER internal concrete vibrators have been delivering constant satisfactory service under all job conditions. VIBERS speed up the job, providing the highest vibration speed in concrete—over 9500 RPM!—at 110 Volts. Easy to work with, portable, rugged—no wonder VIBER gets the call! VIBER'S simplified design with complete interchangeability of parts including power units (electric, pneumatic or gasoline) further eliminates costly delays and lowers costs. So specify VIBER-ation (not ordinary vibration) and put VIBERS on the job.

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DESIGNATORS OF INTERNAL CONCRETE VIBRATION

Hayward Buckets

Use this Class "E" Clam Shell Bucket for handling crushed stone, gravel, sand and other bulk materials.

THE HAYWARD CO., 48-50 Church St., N. Y.

OHIO LOCOMOTIVE CRANES

20 to 50 TON CAPACITY

DIESEL • ELECTRIC • GASOLINE • STEAM

The OHIO LOCOMOTIVE CRANE CO.

BUCYRUS OHIO

POSTWAR PROJECTS (Cont'd.)

N. Y., New York—Isidore H. Goldberg, 2562 Grand Concourse, Zone 58, plans completed by H. I. Feldman, 415 Lexington Ave., Zone 17, 8 story, 50x99 ft. apartment, 192 St. and Grand Concourse. **$200,000.**

N. Y., New York—L. Gordon, 1790 Harrison Ave., Zone 53, plans completed by H. H. Lilien, 2095 Bway., Zone 23, 6 story, 84x150 ft. apartment, Walton Ave. and Burnside Ave. **$275,000.**

N. Y., New York—Haven Properties, Inc., 1331 Boscobel Ave., Zone 52, plans completed by H. H. Lilien, 2095 Bway., Zone 23, 6 story, 84x125 ft., apartment, 143-51 Bennett Ave., **$160,000**; 6 story, 90x155 ft. apartment, 153-63 Bennett Ave., **$200,000.**

N. Y., New York—Hergreer Holding Corp., 2800 Jerome Ave., Zone 58, plans completed by H. I. Feldman, 415 Lexington Ave., Zone 17, 6 story, 60x71 ft. apartment, Sedgwick Ave. and Giles Pl., **$115,000**; 6 story, 90x100 ft. apartment, Boscobel Ave. and 169 St., **$140,000.**

N. Y., New York—Nesor Equities, Inc., J. H. Dimmond, pres., 10 E. 43 St., Zone 17, plans completed by H. Ginsbern, 295 E. 42 St., Zone 17, 6 story, 84x160 ft. apartment, University Ave. and Strong St., **$250,000**; 6 story, 125x190 ft. apartment, University Ave. near Strong St., **$225,000.**

N. Y., New York—North River Savings Bank, 206 W. 34 St., plans completed by C. N. Kent, 140 E. 46 St., altering bank, 206 W. 34 St., and annex at 210 W. 34 St. **$250,000.**

N. Y., New York—R & A Bldg. Corp., L. R. Rice, pres., 125 E. 170 St., Zone 52, plans completed by G. W. Swiller, 535 E. Tremont Ave., Zone 57, 6 story, 107x112 ft. apartment, 231 St. and Sedgwick Ave. **$180,000.**

N. Y., New York—R & A Bldg. Corp., L. R. Rice, pres., 125 E. 170 St., Zone 52, plans completed by G. W. Swiller, 535 E. Tremont Ave., Zone 57, 6 story, 101x112 ft. apartment, Kingsbridge Terrace and 230 St., **$180,000**; 6 story, 100x115 ft. apartment, 231 St. and Kingsbridge Terrace. **$180,000.**

N. Y., New York—Realty & Securities Corp., 1 Liberty St., Zone 5, plans completed by W. Van Alen, 139 E. 52 St., Zone 22, altering 20 story office bldg. 1 Liberty St. **$250,000.**

★**N. Y., New York**—Royal Properties, Inc., S. N. Petchers, pres., 547 W. 110 St., Zone 25, plans completed by M. Wechsler, 103 Park Ave., Zone 17, 12 story apartment, 2380-2398 Bway. **$1,012,000.**

★**N. Y., New York**—705 5th Ave. Corp., Wm. M. Cruikshank, pres., 49 Wall St., Zone 5, plans completed by F. Koebold, 15 Liberty St., Zone 5, 15 story store and office bldg., 715-719 Fifth Ave. **$850,000.**

N. Y., New York—Swanson Realty Corp., 475 Fifth Ave., Zone 17, plans completed by H. I. Feldman, 415 Lexington Ave., Zone 17, 6 story apartment, 250-254 W. 23 St. **$210,000.**

CONTRACTS AWARDED

★**Tex., Dallas**—J. O. Lambert, Jr., & B. Hicks Majors, 2214 Cedar Springs Rd., plans 25% completed by J. O. Lambert, Jr., 2214 Cedar Springs Rd., tourist hotel, Fort Worth Hy. between Plymouth and Hampton Rds., purchase and frire. **$500,000.** Site purchased.

INDUSTRIAL BUILDINGS

PROPOSED WORK

★**Mo., St. Louis**—PLANT—Ford Motor Co., 3000 Schnefer Rd., Dearborn, Mich., plant for mfg. motor cars and adjacent plant to assembly cars, with necessary equip., accessories, appurtenances, etc., probably on 174 acre site near confluence of Mississippi and Meramec Rivers, St. Louis Co., near here. Over **$10,000,000.**

N. J., Hillside — MANUFACTURING—Nelswand & Son, Inc., 13 Montgomery St., 1 story, 70x175 ft. mfg. bldg. **$45,000.**

N. Y., Falconer—PLANT—Jamestown Steel Partitions, Inc., P. O. Box, Jamestown, brick, steel concrete plant addn., Lyndon Park. Over **$50,000.**

Wis., Manitowoc — UTILITY PLANT—Manitowoc Public Utilities, W. C. Stoeffler, mgr., Manitowoc, 3 story, bsmnt., concrete, steel, brick utility plant addn., new boiler.

N. S., Pictou—PLANT—Pictou Foundry & Machine Co., Ltd. Pictou, plant extns. **$75,000.**

Ont., Weston — PLANT — The Arthur & Leitch Co., Ltd., 1123 Bay St., Toronto, plant. **$100,000.** Site purchased.

Que., Hull — FACTORY — Twin-Pin Co. Ltd., Hull, factory. **$40,000.**

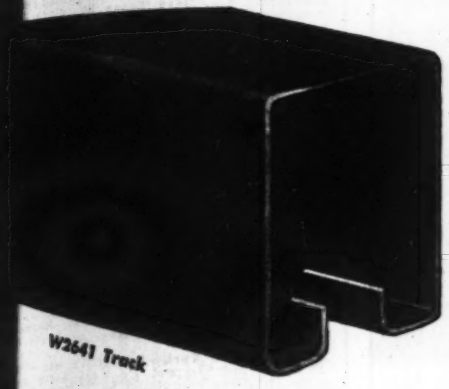
PLANS UNDER WAY

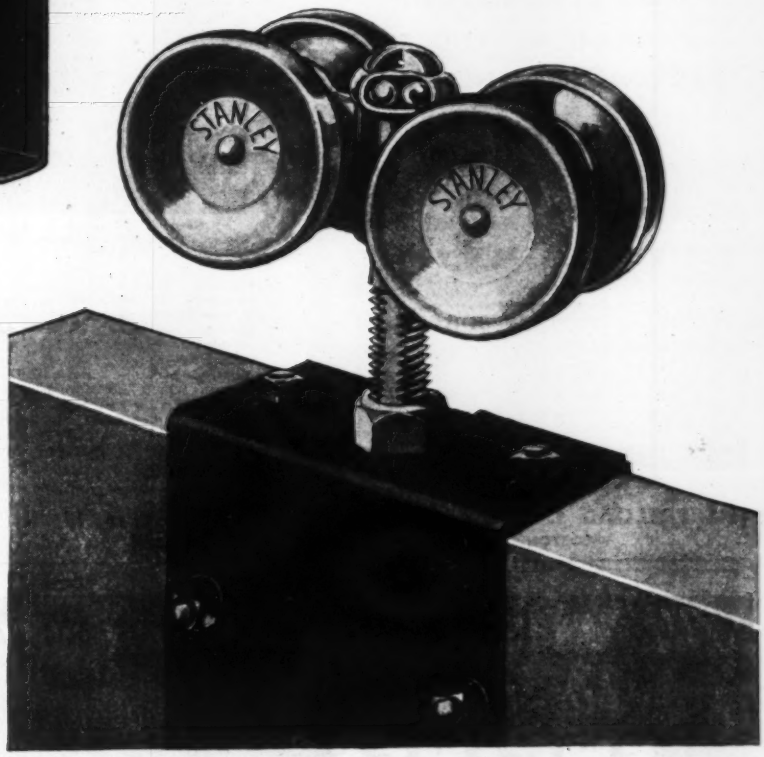
★**Ark., Little Rock** — GENERATING PLANT—Arkansas Power & Light Co., Simmons National Bldg., Pine Bluff, plans under way generating plant, **$4,000,000.**

★**Mo., St. Louis**—ELECTRIC PLANT—Wagner Electric Corp., 6400 Plymouth Ave., Zone 14, preliminary plans nearing completion, 3 story, 120x500 ft., rein.-con. brick, steel addn. to electric mfg. plant. **$600,000.** Total est. $1,000,000 with equip.

STANLEY HARDWARE

For Rolling or Sliding Doors





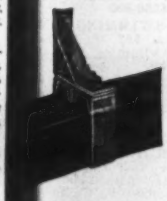
3 SIZES TO MEET ALL NEEDS

For Doors up to 1000 Pounds

Three sizes, X (16 ga.), Y (14 ga.), and W (13 ga.), of Stanley No. 2641 Track and No. 2650 Hangers, will handle all common sliding doors weighing up to 350, 700 and 1000 pounds, respectively.

Stanley Hangers have accurate two-way adjusting nut, ball bearing swivels and roller bearing wheels.

Stanley Track carries the hangers *inside*, protected from weather and dirt. Straight pieces are made "straight as a die." Curved pieces are supplied with 90° turns, others on order. Send for catalog. The Stanley Works, New Britain, Connecticut.



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anley Track becomes virtually a one-piece unit of length when bound end-to-end with Stanley Track kets and Clamps.

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PRELOAD
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ECONOMICAL - ENDURING
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Entirely Built on the Site with Local Labor and Materials—Nationwide Service

Preload Dome, 185 feet diameter, covering 1,500,000 gallon reservoir

Preload 4,200,000 gallon fuel tanks.

Preload 200,000 gallon elevated water tank 38 feet diameter, 126 feet high.

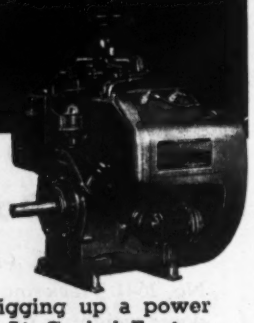
Preload experience gained in hundreds of projects has made it possible to design with proper consideration of earth loads, foundations, shrinkage, temperature differences, plastic flow, working stresses, and all other factors which go into this type construction, to your most exacting requirements.

Write for list of Preload projects and illustrated bulletin "E."

THE PRELOAD CORP., 420 Lexington Ave., New York 17, N. Y.
BOSTON WASHINGTON MONTREAL

All WISCONSIN HEAVY-DUTY Air-Cooled ENGINES

are equipped with EXTENDED SHAFT for Power Drive



You have no outboard bearing problem in rigging up a power take-off when the power unit is a Wisconsin Air-Cooled Engine. All Wisconsin Air-Cooled Engines are equipped with an extended shaft, which is an integral part of the crankshaft proper. Drive pulley, sprocket, gear drive or direct-connected coupling can be attached directly to this extended crankshaft . . . because all Wisconsin Air-Cooled Engines are equipped with *tapered* Roller Bearings at both ends of the crankshaft to take up end-thrust and carry the power load.

This is a feature frequently overlooked by the purchaser of an engine . . . but it is NOT overlooked in the manufacture of Wisconsin Engines . . . built for efficiency and dependable service in *all* ways.

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

POSTWAR PROJECTS (Cont'd.)

★**Tenn., Memphis**—PLANT—Ford Mo... Co., 3000 Schaefer Rd., Dearborn, Mi... plans under way brick, steel, rein.-c... plant addn. **$500,000.**

Tex., Houston—PLANT—Browning-Fer... Machinery Co., 2619 Texas St., plans ... completed by L. M. Wirtz, 500 Stuart ... brick, hollow tile, concrete, steel trusses, ... plant addn. Over **$40,000.** CD 10/10—E... 10/12, under Industrial Bldgs.

Tex., San Antonio—WAREHOUSE—B... Mindes, 201 N. Alamo St., plans 10% co... pleted by Smith, Pitts & McPherson, Ala... National Bldg., warehouse, double railw... tracks, etc., at S. P. Ry. tracks betwe... Florida and Delaware Sts. **$100,000.** S... purchased.

READY FOR BIDS.

Mass., Everett — TERMINAL — Capi... Motor Transportation Co., Inc., 145 Bwa... (Rear), plans completed by H. H. Seleen... 439 Bway., Chelsea 1 story, 70x118 ... terminal, garage and freight facilit... **$40,000.**

N. Y., New York—FACTORY—Castle H... Realty Corp., 1071 Sixth Ave., Zone 18, pla... completed by J. Douglas Weiss, 101 Pa... Ave., Zone 17, 2 story, 97x202 ft. factory ... textile finishing and dyeing, St. Raymo... Ave. from Castle Hill Ave. to Purdy S... **$210,000.**

★**N. Y., New York**—FACTORY, etc.—Pa... & Tilford, Import Co., 485 Fifth Ave... Zone 17, plans completed by I. Kudroff, ... Park Ave., Zone 17, 10 story, 125x200 ... factory and storage bldg., 541-53 W. 42 S... **$755,000**; 10 story, 95x100 ft., factory a... storage bldg., 580-88 11 Ave., **$325,000.**

Pa., Harrisburg — WAREHOUSE — W. ... Mumma, Pennsylvania Supply Co., 10 a... Mulberry Sts., plans completed by W. Lyn... Murray, 1100 North Second St., commerci... storage warehouse. **$100,000.**

UNCLASSIFIED

PROPOSED WORK

Arkansas — RURAL LINES — Petit Je... Electric Co-Operative, Clinton, exten. ru... lines in Faulkner, Conway, Van Bure... Cleburne and Pope Counties. **$370,000.**

Conn., Glastonbury—PARK—Town, B... Selectmen, H. M. Connolly, First Selectma... park development, picnicing facilities, recr... ation, bathing, swimming pool, Cott... Hollow on 57 acre site. **$25,000.** Site pur... chased.

Mass., Worcester — ARENA — Town, c... A. J. Roy, archt., 22 Elm St., 1 stor... 100x300 ft., brick, steel, cinder block arena... Webster Square. **$55,000.**

Mich., Dearborn—PARK STRUCTURE—... City, City Hall, park structure, **$130,000.**

Mich., Midland—PARKS—City, City Ha... 2 parks. **$25,000.**

Mich., River Rouge—PARK STRUCTUR... —City, City Hall, park structure, **$142,000.**

N. Y., Little Falls—SWIMMING POOL—... City, City Hall, swimming pool at Moreland... Park. **$40,000.** State Aid Planning Fund... allotted.

Ore., Portland—RACE TRACK—Portla... Downs, Inc., Jantzen Beach Park, hor... race track, incl. grandstand, clubhouse... stables, at Jantzen Beach Park. **$215,0...**

★**Texas** — TRANSMISSION LINES, etc. — **South Texas Electric Co-operative**, Cuer... electric power transmission lines in 7 ad... jacent counties. **$300,000** or more; brick... rein.-con. central electric generating plan... in Thomaston, serving above pipeline, **$250,000.**

Tex., Beaumont—PARK—Texas State Pa... Bd., Austin, park development, incl. complet... grounds development, bathing, swimmin... athletic facilities, etc., at McFadden Beach... **$350,000.**

Tex., Brownsville — PARK — Texas Sta... Park Bd., Austin, park development, inc... grounds development, swimming, boatin... bathing facilities, etc. **$250,000.**

Tex., San Antonio—SWIMMING POOL... etc.—Dr. J. J. Martinez, 902 W. Magn... St., rein.-con. outdoor swimming pool, ath... letic courts. Over **$25,000.**

Wash., Seattle—ATHLETIC STADIUM—... School Bld., City Hall, high school athle... stadium. **$300,000.**

PLANS UNDER WAY

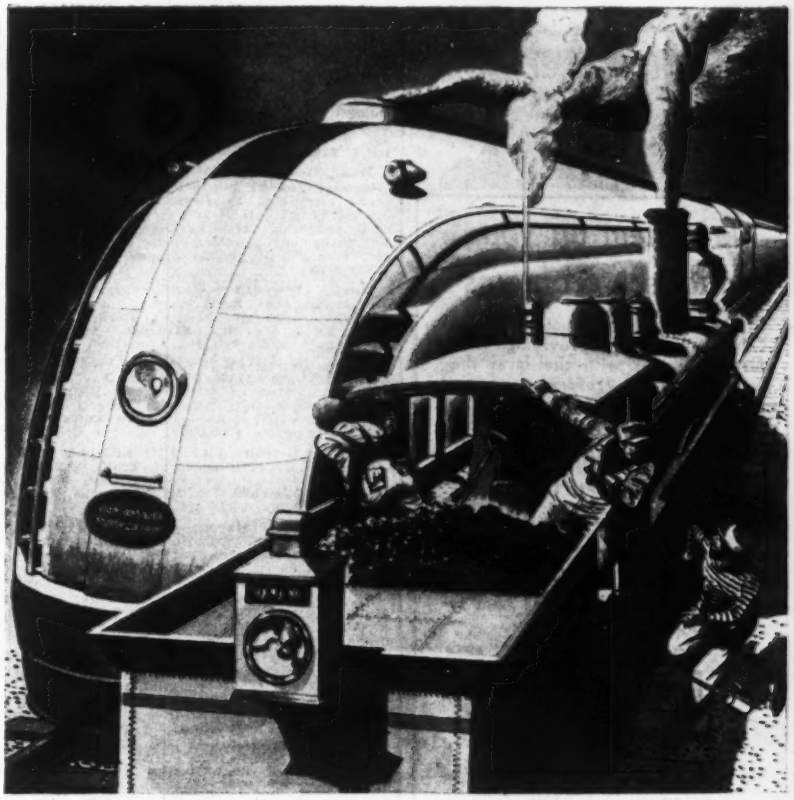
Conn., New Britain—SUBWAY—City, W... Kraut, chn. Dpt. P. Wks., City Hall, subway... rein.-con. for electrical installations a... transformer vaults, **$110,000.** G. W. Mollen... City Hall, engr.

Ind., Crawfordsville — AIRPORT — Cit... T. L. Cooksey, mayor, City Hall, plans 2... completed airport. **$50,000** or more w... equip. Purchased 152 acre site. L. ... Clurg, City Hall, city engr. CD 8/2—E... 8/24.

Ia., Denison—AIRPORT—City, A. Kra... ness, chn., voted **$36,000** bonds, municip... airport. C. Lechtner, Ames, consult. en...

Ia., Swea City—SWIMMING POOL—Ci... A. J. Christensen, mayor, City Hall, swim... ming pool. **$25,000.** O. T. Molan, City Ha... city engr.

THERE'S BEEN A BIG CHANGE



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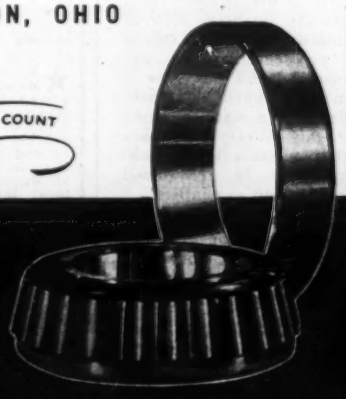

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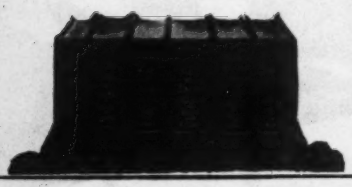

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POSTWAR PROJECTS (Cont'd.)

Massachusetts — PARK IMPROVEMENTS —Commonwealth of Massachusetts, Dpt. Conservation, 15 Ashburton Pl., Boston, plans by P. W. Dorr, 23 Commonwealth Ave., Boston, recreation facilities, imprvs., etc., Roland C. Nickerson State Park, Standish Reservation and Myles Standish State Forest, Brewster, Plymouth, North Duxbury, PF-8, **$110,000.**

Mass., Boston—BATH HOUSE—City, Trustees, Geo. Robert White Fund, 45 City Hall, plans completed by Leland & Larson, 814 Statler Bldg., bath house, recreational center and solarium, at Charlesbank. **$250,000.** Financing not provided for. M. A. Reidy, 101 Tremont St., consult. engr. CD 1/21—ENR 2/10.

Mass., Worcester—PARK—City, P. D. Kneeland, chn. Park Comrs., City Hall, imprvs., expansion Morgan Park, Indian Lake at Grove St. **$110,000.** Olmstead Brothers, 999 Warren St., Brookline, archts.

Mich., Detroit—MAUSOLEUM—Woodlawn Cemetery Assn., 19975 Woodward Ave., plans 50% completed by Harley & Ellington, archts. and consult. engrs., 1507 Stroh Bldg., brick, concrete, stone masoleum units and chapel. Approx. **$200,000.**

★**Mich., Detroit**—TRAFFIC SIGNAL IMPROVEMENTS—Detroit Traffic Engineering Bureau, City Hall, traffic signal imprvs. **$3,000,000.** G. R. Thompson, City Hall, city engr. CD 3/30/43—ENR 4/1/43.

Mich., Port Huron — AIRPORT — Bd. Supervs., St. Clair Co., Port Huron, selected site for airport, incl. parking aprons, taxi strips, 60x200 ft. hangar bldg., **$350,000.** W. Gaskins, Marysville, engr.

Minn., Springfield—AIRPORT—City, A. C. Mueller, clk., City Hall. Class 2 municipal airport. Over **$25,000.** Hitchcock & Estabrook, 521 Sexton Blvd., Minneapolis, consult. engrs. CD 7/14—ENR 8/10.

N. Y., Batavia—ATHLETIC FIELD—Bd. Educ., W. Main St., preliminary plans completed by J. W. Kideney, 1344 Prudential Bldg., Buffalo, Zone 2, grandstand athletic field. **$45,000.** Financing not provided for.

N. Y., Binghamton—FIRE AND POLICE SIGNAL SYSTEM—City, City Hall, plans 35% completed rehabilitation fire and police signal sys. **$305,000.** Financing not provided for. C. E. Beach, Security Mutual Bldg., consult. engr. J. A. Giles, city engr. CD 2/25—ENR 3/9.

N. Y., Far Rockaway—SWIMMING POOL, etc.—Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York, Zone 21, plans under way swimming pool, bleachers, filter house, and incidental imprvs., Jacob Riis Park. **$350,000.** Skidmore, Owings & Merrill, 5 E. 57 St., New York 22, archts. CD 2/1/43—ENR 2/4/43, under Rockaway.

N. Y., Flushing—PARK IMPROVEMENTS —Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York, Zone 21, plans under way tide gate, pedestrian bridge, drinking fountain, tool house, foot bridges, etc., in Alley Pond Park, P-83. Madigan-Hyland, 20-04 41 St., Long Island City, consult. engr.

N. Y., Fonda—PARKS—Monroe Co., Fonda, plans 60% completed, imprv. 5 parks, incl. roads, parking areas, watermains and service, maintenance of bldgs., skating shelters, bath house, outdoor masonry fireplaces, comfort station, channel bank revetment and sea wall imprv. **$226,000.** S. B. Van Duser, 1460 South Ave., Rochester, archt. F. H. Carroll, 244 S. Plymouth Ave., Rochester, dir. P. Wks.

N. Y., Mount Vernon—PLAYGROUNDS—City, plans completed imprv. 11 playgrounds. **$50,000.** Financing not provided for. Chas. M. Hick, city engr. CD 3/9—ENR 3/23.

★**N. Y., New York**—TUNNEL—President Manhattan Boro, Municipal Bldg., Zone 7 and New York City Tunnel Auth., 200 Madison Ave., Zone 16, Mid-Manhattan Underpass incorporating underground motor vehicle terminal between 5 and 6 Aves., and 36 and 38 Sts., linking Queens Midtown and Lincoln Tunnels, eastbound tunnel to run in 36 St., west bound tube in 38 St., with 2 local lanes under 37 St.; designs by H. Wiley Corbett, 300 4 Ave., air terminal bldg. above underground terminal. Est. **$75,000,000.**

N. Y., White Plains—AIRPORT BLDGS.—Comrs. Westchester Co., White Plains, plans 50% completed hangars, administration bldgs., at Westchester Co. Airport, **$200,000,** Alexander D. Crosett & Associates, 512 5 Ave., New York, Zone 18, archts.; plans completed access roads, water and sewers, **$150,000.** Financing not provided for. C. A. Garfield, County Office Bldg., White Plains, engr. CD 5/24—ENR 6/1.

N. Y., Woodhaven—PARK RECONSTRUCTION—Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York, Zone 21, plans under way reconstructing portion of Forest Park, W. of Woodhaven Blvd., P-125. **$300,000.** G. D. Clarke, 10 Rockefeller Plaza, New York 21, consult engrs. CD 1/28—ENR 2/10, under New York.

★**Pa., Phila.**—AIRPORT HANGARS, etc.—City, City Hall, plans under way hangars, bldgs., Northeast Airport, WA10, **$1,000,000;** runways, complete taxi sys., new loading

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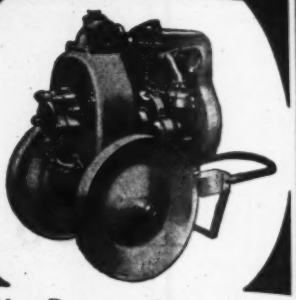

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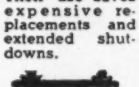

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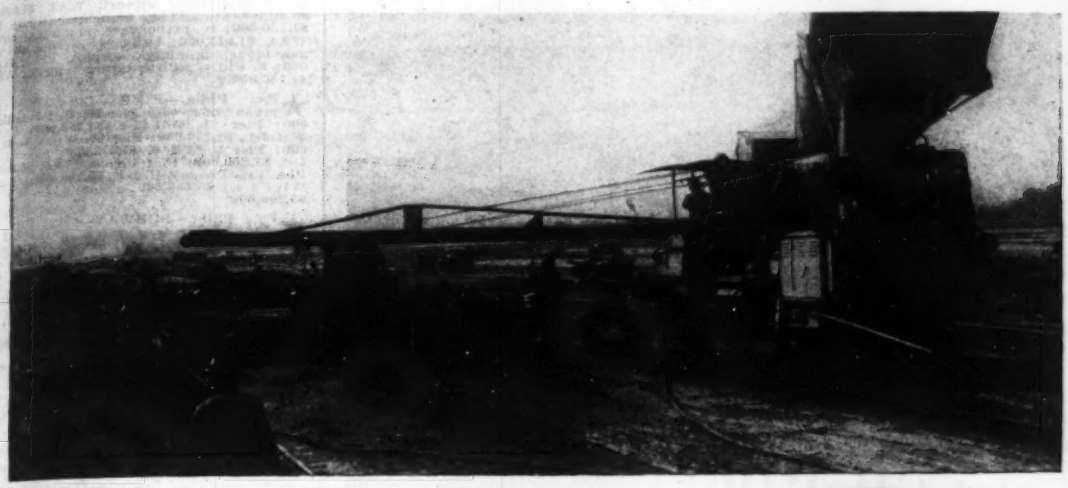
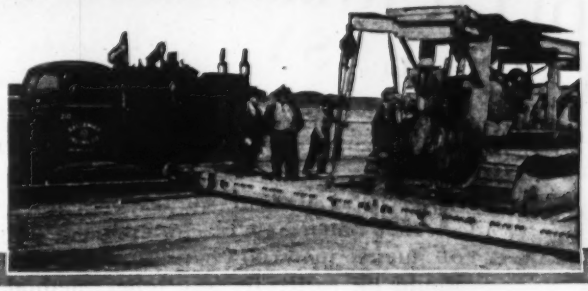


Ballenger Paving Company, Greenville, South Carolina, has just completed well ahead of schedule the concrete paving of runways on this rush airport project in eastern Georgia. The job was operated on a daily schedule of 800 batches and 5,000 square yards of concrete. In the photo at right a Gulf Service Engineer (left) is shown consulting with Superintendent Jim Chandlee on the lubrication of the equipment employed on this job.



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says Superintendent Jim Chandlee

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Rush schedules call for top performance from every unit of equipment and freedom from costly and time-consuming mechanical delays. That's why a majority of leading contractors on all types of projects keep a Gulf Service Engineer "in the picture" and adopt his recommendations for the proper lubricants and fuels.

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POSTWAR PROJECTS (Cont'd.)

ramp, municipal airport, WA3, **$1,500,000**; administration bldg., municipal airport, WA3, **$1,130,000**; seaplane base, municipal airport, WA4, **$1,015,000**; hangars, service and storage bldgs., municipal airport, WA2, **$4,630,000**; S. Phila. railroad yard imprvs., WE13, **$1,750,000.**

★**Pa., Phila.**—PIERS—City, City Hall, plans under way Pier 35, WH 5-d, **$1,250,000**; Pier 31, WH 5-c, **$1,250,000**; Pier 30, WH 5-b, **$1,250,000**; Pier 29, WH 5-A, **$1,250,000**; Pier 2, WH 4, **$1,272,000**; Pier 31, WH 5-c, **$1,250,000**; Pier 106, WH 3-a, **$5,200,000**; Pier 108, Proj. WH 3-b, **$5,200,000**; Pier 110, WH 3-c, **$5,100,000**; Pier 112, WH 3-d **$5,200,000.**

★**Pa., Phila.**—SUBWAY—City, City Hall, plans under way exten. Frankford Elevated Highspeed Line, Proj. CT-8, **$9,581,000**; general imprvs. highspeed lines, Proj. CT-3, **$205,200**; Locust St. Subway, Proj. CT-4, **$1,951,000**; exten. Locust St. subway, Proj. CT-5, **$33,166,000.** G. Exley, City Transit dir. T. Buckley, City Hall, city engr.

Tex., Dallas — AIRFIELD BLDG.—City, plans 5% completed tripling size existing Love Field airport administration bldg. **$350,000.** Thos. D. Broad, Burt Bldg., archt.

Tex., Dallas—PARK—City, City Hall, park, incl. swimming pool, clubhouse-gym., grounds development, etc., 16 acre site in Dentex Addn. **$100,000.** Hare & Hare, 114 W. 10 St., Kansas City, Mo., consult. engrs.

★**Tex., Mineral Wells**—PARK SYSTEM—Texas State Park Bd., Austin, plans 50% completed developing 6,869 acre plot for public park sys., incl. bridges, equip. and supply storage houses, airplane landing fields, grounds development, water, sewer, lighting sys., cabins, fencing, etc., in Possum Kingdom Dam area, 25 mi. west of here. **$1000,000.** CD 10/23—ENR 11/2.

Tex., Stephenville—RUNWAYS, etc.—City, C. W. Bryant, chn. Airport Comn., 2 addnl. runways 3,000 ft. long, **$150,000**; administration bldg., **$40,000**, on 160 acre site southeast of city. H. C. Doremus, c/o Airport Comn., engr.-archt.

READY FOR BIDS.

New Hampshire — RURAL ELECTRIC LINES—New Hampshire Electric Cooperation, Inc., 14 Main St., Plymouth, plans completed 181 mi. rural electric lines, Grafton Co. **$180,000.**

N. Y., Oneonta—FIRE ALARM SYSTEM—City, plans completed imprv. fire alarm sys. **$25,000.** F. M. Gurney, city engr. CD 4/7—ENR 4/20.

★**North Carolina** — RURAL ELECTRIC LINES—French Broad Electric Membership Corp., Marshall, plans completed 526 mi. rural electric lines, Madison Co. **$524,000.**

North Carolina — RURAL ELECTRIC LINES — Haywood Electric Membership Corp., Box 630, Waynesville, plans completed 267 mi. rural electric lines, Haywood Co. **$266,000.**

North Carolina — RURAL ELECTRIC LINES—South River Electric Membership Corp., Stedman, plans completed 451 mi. rural electric lines, Cumberland Co. **$451,000.**

North Carolina — RURAL ELECTRIC LINES—Union Electric Membership Corp., Monroe, plans completed 90 mi. rural electric lines, Union Co. **$90,000.**

Pennsylvania—RURAL ELECTRIC LINES—Central Electric Cooperative, Inc., Parkers Landing, plans completed 35 mi. rural electric lines, Armstrong Co. **$35,000.**

Pennsylvania—RURAL ELECTRIC LINES—Central Rural Electric Cooperative Assn., Inc., 212 N. 3 St., Clearfield, plans completed 126 mi. rural electric lines, Clearfield Co. **$126,000.**

Pennsylvania—RURAL ELECTRIC LINES—Somerset Rural Electric Cooperative, Inc., Somerset, plans completed 82 mi. rural electric lines, Somerset Co. **$82,000.**

Pennsylvania—RURAL ELECTRIC LINES—Tri-County Rural Electric Cooperative, Inc., Mansfield, plans completed 137 mi. rural electric lines, Tioga Co. **$137,000.**

Pennsylvania—RURAL ELECTRIC LINES—Valley Rural Electric Cooperative, Inc., Huntingdon, plans completed 148 mi. rural electric lines, Huntingdon Co. **$148,000.**

Pennsylvania—RURAL ELECTRIC LINES—Warren Electric Cooperative, Inc., 302 E. Main St., Youngsville, plans completed 131 mi. rural electric lines, Warren Co. **$131,000.** CD 9/14—ENR 10/5.

PROJECTS CANCELLED.

Me., Rumford Falls—AIRPORT, etc.—Town, J. M. Wyman, mgr., Town Hall, cancelled airport, **$100,000**; park imprvs., **$30,000.** Work going ahead now. CD 9/29—ENR 10/19.

★**Texas and California** — PIPELINE—Southern California Gas Co., Southern Counties Gas Co., Pacific Gas & Electric Corp., 810 S. Flower St., Los Angeles, Calif., cancelled 1,000 mi. natural gas pipeline from Panhandle and Huguenot Fields, Texas, to Los Angeles, Calif. **$60,000,000.** Work going ahead now. CD 3/23—ENR 4/6.

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

ELSIE EAVES, Manager *SCOTT McLEOD, Statistics* *J. A. MAHONEY, Reports*

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WATER SUPPLY

PROPOSED WORK

Mont., Billings—City, 24 in. water supply main from water plant to storage tanks. $73,000. K. Chrysler, City Hall, city engr.

Mont., Lodge Grass—City, City Hall, water sys. $30,000. Funds approved.

O., Canton—Comrs., Stark Co., Court House, preliminary plans water distr. sys. in Jones-Reedurban Dist. $150,000. L. K. Zerbe, Court House, co. engr.

Okla., Oklahoma City—C. F. Aurond, city mgr., City Hall, filter plant and pump. station, $971,569. Applied for FWA funds. H. V. Long & Co., 1300 Colcord Bldg., Zone engrs.

Pa., Phila.—Dpt. P. Wks., water pipe and appurtenant work, Roosevelt Blvd.; Roddy St. in 50 Ward; Suffolk Ave. in southwest Phila.; Cliveden St., Thomson St. to Conkelin Pike. M. J. McLaughlin, Water Bureau Chief.

Pa., Somerset—Somerset Borough, c/o Borough Councilmen, Somerset, imprv., enlarging WW. $25,000.

Tex., Longview—W. M. Works, city mgr., City Hall, WW sys. imprvs., incl. booster pump station, imprv. filter plant and distr. sys. $162,500. Applied for FWA funds. Freese & Nichols, Capps Bldg., Fort Worth, engr. CD 8/2—ENR 8/10.

†**Tex., Weatherford**—C. Russell, mayor, City Hall, water and sewer imprvs., Tex. 7-101. $47,000. **FWA.** J. J. Rady, Insurance Bldg., Fort Worth, engr. CD 9/15—ENR 9/21.

W. Va., South Charleston—Carbide & Carbon Chemical Co., 30 E. 42 St., New York 17, N. Y., exten. water treating plant, installing chlorinator equip. $387,-000.

N. B., Fredericton—Exten. water services to recently annexed town of Devon. $40,000.

Ont., Brigden—Council, Special Com., Geo. Symington, F. Kilbreath, H. MacDonald, installing WW sys. $25,000–$35,000.

Ont., Ottawa—Municipality, water services to Catholic Episcopal Association, Main St. $9,000. W. E. MacDonald, City Hall Offices, Rideau St., engr.

Ont., Petrolia—Petrolia Pub. Utilities Comm., E. Weager, mgr., reservoir and booster pump. sta. $85,000. G. G. Reid, 7 Raymund Ave., Toronto, engr.

Ont., St. Thomas—Water services to new residential division, southeast zone of city. $5,000. F. A. Bell, County Bldg., engr.

Ont., Toronto—Toronto Twp., D. J. Lammy, Clerk, J. H. Pinchin, clk., Cooksville, preparing plans new filtration plant. About $90,000. Gore & Storrie, 1130 Bay St., engrs.

BIDS ASKED

Bids Asked November 20

N. Y., New York—Commissioner Water Supply, Gas & Electricity, Municipal Bldg., Zone 7, hauling, laying watermains, appurtenances, Madison and 249 Sts., 24 Rd. and Garden Ct., Queens Boro. Plans deposit $1.

Bids Asked November 24

Del., New Castle—Bd. Water & Light, 1 Delaware Ave., filter plant, Del. 7112. $5,000. **FWA.** CD 10/5—ENR 10/12.

Bids Asked About November 30

R. I., Pascoag—Pascoag Fire Dist., R. Plant, chn., piping connecting new wells with water supply sys. Over $15,000. CD 9/10.

LOW BIDDERS

Fla., Miami Beach—Installing waterlines, piers, from J. Reinertson, 2027 N. W. 7 Aves., Miami, **$227,073.** CD 5/1—ENR 5/4.

Ga., Columbus—Comrs. Roads & Revenues Muscogee Co., Columbus, Oct. 25, WW exten., booster station, watermains, tank, 5-290, Div. 1, from Schley Gordy, Columbus, **$44,462. FWA.** CD 10/10—ENR 10/12.

R. I., Fiskville—Pawtuxet Valley Water Co., 1072 Main St., West Warwick, Oct. 10, 1,000 gal. concrete water reservoir, from Crowley Constr. Co., 260 Central Ave., Pawtucket, approx. **$30,000.** CD 10/6—ENR 9/28.

Tenn., Murfreesboro—S. Cox, city mgr., City Hall, Oct. 10, WW., from Bush Bldg. Co., 305 8 Ave. N., Nashville, **$188,000.** Copeland Roberts & Co., 3rd National Bank Bldg., Nashville, engrs. CD 7/27—ENR 8/3.

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering New-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads); BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Tex., Colorado City—J. A. Sadler, mayor, City Hall, Oct. 31, water storage reservoir, from Thomas & Ratliff, Rogers, **$35,500.** Est. $50,000. Freese & Nichols, Capps Bldg., Fort Worth, engrs. CD 10/17—ENR 10/19.

†**Tex., Baytown**—Harris County Fresh Water Supply Dist. 8, E. M. Walker, pres., Nov. 8, 5,700 ft. 8 and 6 in. c.i. watermains, 60 service connections, removing, relaying 3,570 ft. 2 and 4 in. distr. mains, and approx. 25,000 ft. sewage collection sys. and outfall lines, Tex. 41-681, from Brown & Root, Inc., Box 3, Houston, **$64,537. FWA.** CD 11/1.

Tex., Houston—City, M. H. Westerman, secy., City Hall, Nov. 1, 36 and 30 in. transmission main in South Blvd., Bertha and Calumet Sts., from Tellepsen Constr. Co., 3900 Clay Ave., **$144,196,** est. $140,000; 16 in. c.i. watermain in public road 1,663 ft. east of center line Weslayan Road from Alief Rd. north to W. Alabama Ave., 12 in. c.i. main in same road from W. Alabama Ave. to Larchmond, from Claude Everett, Inc., 522 Barziza St., **$42,669.** J. Dannenbaum, City Hall, engr.

Wash., Seattle—Water Dist. 20, 703 Arctic Bldg., Zone 4, Nov. 9, water sys., from Thorburn & Logozo, 4608 36 Ave. S.W., **$30,806.** CD 10/30—ENR 11/2, under LB.

Wash., Sunnyside—City, City Hall, Nov. 3, installing watermain, drilling well, from A. G. Homann, 112 N. Franklin St., Olympia, **$28,279.**

CONTRACTS AWARDED

Ala., Opelika—J. W. Whatley, city comr., City Hall, dam for reservoir, to Scott Constr. Co., Thomasville, Ga., **$142,772;** clearing for reservoir, to J. E. Milam Constr. Co., 8940 First Ave. S., Birmingham, **$34,500.** CD 10/23—ENR 10/26.

†**Fla., Fort Pierce**—City, City Hall, WW imprvs., incl. million gal. water storage plant, new water softening unit, etc., to Gabel Constr. Co., Orlando, **$131,500.** CD 9/19—ENR 9/21.

†**Fla., Fort Walton**—City, addnl. water and sewer facilities, Fla. 8-315-F, Contr. Div. 1, to Paul Smith Constr. Co., 310 N. Rome Ave., Tampa, **$82,016;** Contr. Div. 2, to HTG Co., Troy, Ala., **$121,406. FWA.** Bids 10/16. CD 9/19—ENR 9/21.

†**Fla., Lake City**—City, WW, Fla. 8-336-N, to Boyd & Goforth, 1226 W. Forsythe St., Jacksonville, **$77,107. FWA.** Russell & Axon, Daytona Beach, engrs. CD 9/7—ENR 9/14.

†**Pa., Mechanicsburg**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., exten. water loop to Marine Barracks and Dispensary, Naval Supply Depot, NOY 11323, to H. B. Dissinger, 1020 S. 13 St., Harrisburg, **$17,300.**

Tenn., LaFollette — Exten. municipal waterworks and sewerage sys., to Joe C. Meighan Constr. Co., 422 W. Front Ave., Knoxville, **$27,530.** CD10/3—ENR 10/5.

Wis., Lake (P. O. Milwaukee)—Town of Lake Water Utility, 4001 S. 6 St., drilling well, to G. Y. Geiger & Co., 37 N. Van Buren St., Chicago, Ill., **$28,080.** Bids 10/31. CD 10/17—ENR 10/19.

B. C., Prince George—Dpt. Transport, Ottawa, Ont., installing water supply works, to Bennet & White Const. Co. Ltd., 510 W. Hastings St., Vancouver, about **$27,500.** Bids 9/18. CD 9/1—ENR 9/7.

Ont., St. Thomas—Replacing 4 in. with 6 in. watermains, Talbot St., day labor. **$20,000.** Pub. Utilities Comn., St. Thomas, engr.

Ont., St. Thomas—New York Central System, O. E. Armstrong, engr. M.W., 466 Lexington Ave., New York 17, N. Y., replacing 4 in. by 6 in. mains, day labor. **$15,000.**

Ont., Sarnia—Sarnia Twp., A. Miller, clk., R.R. 1, 8,000 ft. 6 and 8 in. watermains, to Keystone Contractors, Ltd., 732 Langlois St., Windsor, **$20,000.** W. C. Monteith, City Hall, engr. CD 10/12—ENR 8/17.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Loma Linda—Loma Linda Sanitation Dist., c/o Dr. S. P. S. Edwards, Loma Linda, sewage disposal plant, $125,000. Currie Engineering Co., Anderson Bldg., San Bernardino, engr.

Calif., Los Angeles—City, Bd. P. Wks., City Hall, sanitary sewer in Ithaca Ave., etc., $25,609. L. Aldrich, City Hall, engrs.

Calif., Los Angeles — Bd. Supervs. Los Angeles Co., Hall of Records, 1.88 mi. vitr. clay sanitary sewer, Valley Ridge Ave., etc., CI 1092. $36,740. A. Jones, Hall of Records, engr.

Calif., Monterey Park—Bd. Supervs. Los Angeles Co., 10.41 mi. sanitary sewers in Sadler Ave. and other Streets, CI 1081. $204,200. A. Jones, Hall of Records, engr.

Calif., Pomona—Cities of Pomona, Claremont and La Verne, reconstructing sewage disposal plant and expan. sanitary sewer facilities, reception reservoir, booster line and pump. station, $226,458. F. C. Froehde, City Hall, Pomona, city engr. Black & Veatch, 4706 Bway., Kansas City, Mo., consult. engrs.

Calif., Salinas—City, F. E. Heple, clk., City Hall, rejected bids Nov. 16, imprvs., addns. to certain sewage works proj. CD 10/20—ENR 10/26.

★**Calif., San Francisco** — City and San Francisco Co., City Hall, Lincoln Way outfall sewer, $192,600; Lower Islais (repair wood box), $25,000; replace temporary box, Glen Park, $61,000; Baker St. outfall, $100,-000; enlarging Scott St.—Secta. A-E, $1,200,-000; Upper Army Street—Sect. A, $100,000; Ingleside—Sect. B, $155,000; Lower Army (repair), $125,000. J. J. Casey, City Hall, city engr.

Conn., Glastonbury—Town, B. F. Turner, chn., 2327 Main St., preliminary surveys determining sewerage disposal requirements northern section of town. Over $25,000. Keis & Holroyd, 257 Bway., Troy, N. Y., engrs.

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BRANCH WAREHOUSE—Gary, Ind.

SEWERS, WASTE DISPOSAL (Proposed Work, Cont'd.)

La., Gretna—Jefferson Parish Police Jury, Gretna, voted bonds incinerator. $250,000. R. Steinwinder, Metairie, engr. CD 11/9. ENR 11/9.

†Me., Bath—City, Treasurers Office, City Hall, rejected bids Oct. 30 for refuse incinerator. **FWA.** May readvertise about February, 1945. Metcalf & Eddy, 1390 Statler Bldg., Boston, Mass., engrs. CD 11/3—ENR 11/9.

Mich., Davison—Village preparing plans sanitary sewer and sewage treatment plant. Approx. $50,000. Gould Engineering Co., 726 Evergreen St., Flint, Zone 3, engrs.

Mich., Royal Oak—Royal Oak Twp., E. M. Orr, engr., 2214 Michigan Ave., Dearborn, making plans sewers serving Royal Oak Twp., vicinity of Eight Mile Rd. and Wyoming Ave. Over $25,000.

Pa., Phila.—Dpt. P. Wks., City Hall Annex, making plans sanitary sewers in 16 streets northeast sect. city. T. Buckley, city engr.

Tex., San Antonio—Sanitary sewer main in Harlandale Section. $25,000. T. Coghlan, City Hall, engr.

†Va., Blackstone—Town, sewerage system extens., incl. 12,000 ft. 8 and 10 in. sewer, 2,100 ft. 6 in. force main, lift station, manholes, appurtenances. V.a. 44-423-N. $40,200. **FWA.**

Wash., Grandview—Secondary sewage disposal plant. $45,000. J. W. Carey, Empire Bldg., Seattle, Zone 4, engr. CD 9/27—ENR 10/5.

Alta., Stettler—Sewer extens., imprv. activated sludge plant sys. $40,000. G. T. Murgatroyd, Town Hall, engr.

B. C., Kelowna — Sewer extens., addn. Imhoff tanks, etc. $30,000. H. A. Blakeborough, City Hall, engr.

Man., Brandon—Sewage treatment plant $90,000.

N. B., Fredericton—Exten. sewer service to recently annexed town of Devon. $60,000.

N. S., Dartmouth—Incinerator. $40,000. L. Allen, Town Hall, engr.

Ont., Carleton Place — Sewers, possible addnl. Imhoff type tank or sedimentation tank, $40,000. M. W. Rogers, Carleton Place, engr.

Ont., Goderich — Hay Twp., Goderich drainage. $30,000. R. Patterson, County Bldg., Goderich, engr.

Ont., Ottawa—Municipality, sewerage service to property of Roman Catholic Episcopal Association at south end of Main St. $38,000. F. C. Askwith, City Offices, Rideau S., Works Comr. and Engr.

Ont., Palmerston—S. Mathers, municipal clk., sewer exten. $35,000.

Ont., Preston—Sewage treatment plant $75,000.

Ont., Rainy River—E. E. Jess, municipality clk., sewers. $25,000.

Ont., St. Thomas—Sewer services to residential sect. in southeast sect. of city $90,000. F. A. Bell, County Bldg., engr.

Ont., Sarnia—Sewage treatment plant $100,000.

Que., Bourlamaque—Sewerage sys. $40,000.

Que., Mont Joli—J. Dube, municipal clk., sewer extens. $30,000.

Que., Noranda — Sewer extens., probable addn. to activated sludge plant. $40,000. A. M. Hogg, Town Hall, engr.

Que., Ste. Agathe des Monts—G. Vanier, municipality clk., sewer extens. $35,000.

Que., Valleyfield—Sewerage sys. $50,000. R. Belanger, City Hall, engr.

Sask., Battleford—Sewerage sys. C. F. Goodspeed, Town Hall, engr.

Sask., Gravelbourg—A. Doutre, municipality supt., Town Hall, sewerage sys. imprvs.

Sask., Indian Head—G. Pitt, municipal supt. and engr., Town Hall, sewer extens. $35,000.

Sask., Melfort—Activated sludge plant as sewerage sys. exten. $37,000. D. M. Lauchean, Town Hall, supt.

BIDS ASKED

Bids Asked November 20

Ont., Toronto—J. T. Stewart, 1660 Kingston Rd., garbage incinerator. $60,000. M. Baird, 1683 Kingston Rd., engr.

Bids Asked November 24

†Calif., Hueneme—Federal Works Agency, 1206 Santee St., Los Angeles. 24,668 lin. ft. 8 and 18 in. vitr. cly sanitary sewerage sys. for 543 war housing units, Calif. 4-468. $170,300. **FWA.** S. G. Bennett, 1164 Say St., Santa Paula, engr.

LOW BIDDERS

Calif., Long Beach—City, City Hall. No. 6, 10,929 lin. ft. vitr. clay sanitary sewer. Sewer Dist. 11A-1, from M. Radich, 2 Empire Ave., Burbank, **$39,681.** Est. $38,000. G. E. Backer, City Hall, city engr.

†Va., Denbigh—Warwick County School Bd., at office T. Ryland Sanford, supt., No. 3, small sewage station, etc., Va. 44-428-S. from W. D. Waters Co., Portlock Bldg., Norfolk, **$38,202. FWA.** CD 10/24—ENR 10/26.

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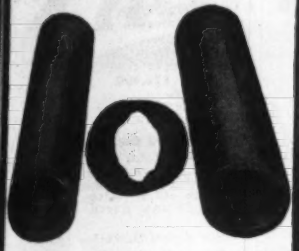
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SEWERS, WASTE DISPOSAL (Contracts Awarded, Cont'd.)

Conn., Stratford—Chance Vought Div., United Aircraft Corp., 550 Main St., brick, concrete incinerator plant, to E & F construction Co., 94 Wells St., Bridgeport. Est. **$40,000.** Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., engrs. CD 10/20—ENR 10/26.

Fla., Jacksonville—City Comrs., City Hall, incinerator on Southside, to Nichols Engineering & Research Corp., 60 Wall Tower, New York, N. Y., about **$100,000.** CD 9/25—ENR 9/28.

†**Fla., Gainesville**—City, sewerage collection sys., imprvs., extens., Fla. 8-326-N, to J. B. Owens, 1214 Drew St., Clearwater, **$29,030. FWA.** CD 10/5—ENR 10/12.

†**Fla., Whiting Field** — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., storm drainage facilities, Naval Auxiliary Air Station, NOY 10113, to Smith Engr. & Constr. Co., P. O. Drawer 1831, Pensacola, **$216,355.** CD 9/22—ENR 9/28.

†**Neb., McCook**—U. S. Eng., 1709 Jackson St., Omaha, sewage plant, utilities at air base, to Sioux Contractors No. 4, McCook, **$80,000.**

N. J., Glen Rock—Borough, Municipal Bldg., sewer lines for pump sta., to C. Salvatore & Sons, 390 High St., Orange, **$46,391.** F. Evans, Municipal Bldg., engr.

N. J., Perth Amboy—General Cable Corp., 26 Washington St., 120 x 120 ft., brick, steel incinerator, 17 ft. high, to Stone & Webster Engr. Corp., 49 Federal St., Boston, Mass., **$120,000.**

BRIDGES

PROPOSED WORK

Kan., Winfield—Cowley Co., Winfield, 2 steel, concrete bridges over Arkansas River at Douthitt and Geuda Springs, 2 bridges over Walnut St., at McCollurn and Dunkard Hill, $375,000. W. D. Guy, Winfield, co. engr.

Louisiana—Dpt. Hys., Baton Rouge, reconstructing hy. bridge over Tangipahoa River at point where State Hy 408 intersects waterway near Independence, approx. 33 miles above its mouth, Tangipahoa Parish.

Massachusetts—Dpt. P. Wks., Boston, bids soon steel stringer bridge, approaches, relocating Route 202, eliminating grade crossing, 0.241 mi. hy. FAGH 61.2, Templeton, $111,300; bridge and bituminous macadam approaches 0.2 mi. at juncture Routes 5 A and 57 over Westfield River, F.A.P. 136-D-1, Springfield and Agawam, $219,440; steel stringer bridge, approaches over Boston & Maine R.R. on 0.6 mi. Worcester Rd., Route 12, F.A.G.H. 238 D (1) and F.A.P. 238 B-(2) Sterling, $171,000.

Alta, Calgary—Municipality, subway between 9 and 10 Aves. $50,000. J. R. Wood, City Hall, engr.

BIDS ASKED

Bids Asked November 21

New Hampshire—State Hy. Dpt., Concord, 384 ft. deck plate girder bridge and approaches, Dartmouth College Rd. Lebanon, Grafton Co. $175,000. H. E. Langley, Concord, engr.

Bids Asked November 28

N. Y., Brooklyn—Bd. Transportation, 250 Hudson St., Zone 13, viaduct repairs.

LOW BIDDERS

Louisiana—State Hy. Dpt., Baton Rouge, Nov. 8, imprv. Red River Bridge, Avoyelles Parish, from R. R. Littrell, Opelousas, **$194,917.** CD 10/31—ENR 11/2.

Pennsylvania—State Hy. Dpt., Harrisburg, Nov. 10, .87 mi. pipe culverts, drainage ditches, Lebanon Co., from F. M. Rhodes, Jr., Pennside, Reading, **$29,575.** CD 11/1.

CONTRACTS AWARDED

Utah and Colorado—Denver & Rio Grande Western R. R. Co., A. E. Perlman, ch. engr., Rio Grande Bldg., Denver, Colo., repairing, raising wing walls and extend. culverts on 9 concrete culverts, repairing abutments and wing walls on 6 bridge abutments, between Price, Utah and Grand Junction, Colo., to C. L. Hubner Co., 4000 York St., Denver, Colo. CD 6/28—ENR 7/6, under Utah, Price.

STREETS AND ROADS

BIDS ASKED

Bids Asked November 21

N. Y., Brooklyn—Commissioner Parks at Office Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York, Zone 21, sheet asphalt repaving west service road Ocean Parkway from Avenues L to X, Contr. B-65-244.

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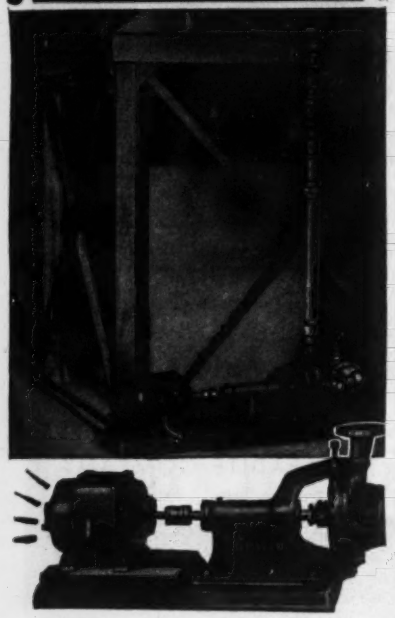

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STREETS AND ROADS (Bids Asked Cont'd.)

Bids Asked November 22

Arkansas—J. H. Crain, chn. State Hy. Dpt., Little Rock, gravel base course and bituminous surfacing course 7.159 mi. Blytheville-Barfield Rd., Mississippi Co. W. W. Mitchell, state hy. engr.

Louisiana—Dpt. Hys., D. Y. Smith, dir., Baton Rouge, gravel surfacing, shaping roadway, drainage structures, etc. 3.9 mi. Maneuver Area Rds., Group 1, Sect. 1 on State Route 21, S.P. 737-00-06; and 23.9 mi. Group 2, Sects. 1, 5, 6 and 7, State Routes 22, 22-D, 113- and 497, S.P. 737-00-16, both Vernon Parish; 11.2 mi. Group 3, Sect. 1 on State Route 75, S.P. 737-00-08, Natchitoches Parish.

Bids Asked November 29

California—State Div. Hys., Sacramento, grading, plant-mixed surfacing on untreated rock, an undercrossing to be constructed under tracks of A.T. & S.F. R.R. Co., on South Ave., 1 mi. west of Fresno Ave., approx. .11 mi. near Stockton, San Joaquin Co. G. T. McCoy, state hy. engr.

Bids Asked November 30

California—G. T. McCoy, engr. State Div. Hys., 801 State Bldg., Los Angeles grade and plant mix and untreated rock base surfacing 1.6 mi on Route 2, at Irvine, Orange Co. Over $25,000.

Bids Asked December 5

Washington—State Hy. Dpt., B. Bantz, dir., Olympia, grading, surfacing 2.736 mi. Primary State Hy. 1, Woodland to Martin's Bluff, Cowlitz Co. Plans deposit $2.

Bids Asked

†**Conn., East Hartford**—Town, Dir. P. Wks., 740 Main St., grading, paving, drainage Chester St., Conn. 6-226-N. $10,000-$15,000. **FWA.**

Ohio—State Hy. Dpt., Columbus, rejected bids Oct. 31, imprv. 0.19 mi. hy., Trumbull Co. CD 11/3—ENR 11/9, under LB.

LOW BIDDERS

California—State Div. Hys., Sacramento, Nov. 1, imprv. 0.7 mi. San Francisco Co., from Fay Imprvt. Co., 760 Market St., San Francisco, **$44,369**; 2.4 mi. between Stockton and Rough and Ready Island, San Joaquin Co., from G. French Jr., P.O. Box 307, Stockton, **$75,254.** CD 10/17—ENR 10/19.

Louisiana—State Dpt. Hys., Baton Rouge, Nov. 8, imprv. 16.7 mi., and 28.9 mi. Rapides Parish, from Glassell General Constr. Co., 1417 Dalzell St., Shreveport, **$92,467** and **$64,182** respectively. CD 10/31—ENR 11/2.

★†**Tex., Fort Worth**—U. S. Eng., 231 W. Main St., Denison, Nov. 3, grading, paving and utilities for addnl. construction Fort Worth Aircraft Assembly Plant, Ser. 41-242-45-68, from Texas Bitulithic Co., 111 Commerce St., Dallas, **$819,000.** CD 10/27.

Virginia—State Dpt. Hys., Richmond, Nov. 9, imprv. 2.2 mi. Louisa Co., from B. W. Jackson Contg. Co., 1009 W. Graham Rd., Richmond, **$26,064**; 3.2 mi. Accomack Co., from P. H. McGuire, 1020 W. 39 St., Norfolk, **$332,411.** CD 10/31—ENR 11/2.

Wisconsin—State Hy. Comn., Madison, Nov. 3, imprv. 2.932 mi. Eau Claire and Jackson Counties, from L. G. Arnold, Inc., Eau Claire, **$261,430.** CD 10/19—ENR 10/26.

CONTRACTS AWARDED

Idaho—State Hy. Dpt., Boise, imprv. 8.4 mi. Lewis Co., to F. R. Hewett Co., Spokane, Wash., **$33,505.** Est. $33,730. Bids 11/3.

Ia., Allison—Butler Co., graveling roads, to Maudlin Const. Co., Webster City, **$223,-853.** Bids 10/23. J. L. Stober, Allison, co. engr. CD 10/17—ENR 10/19.

Maryland—State Roads Comn., Baltimore, Nov. 8, imprv. 5 mi. St. Mary's Co., from E. Stewart Mitchell, 3301 Ridgewood Ave., Baltimore; **$38,191.** CD 11/1.

New Mexico—State Hy. Dpt., Santa Fe, imprv. 10.022 mi. Lincoln and Otero Counties, to Brown Brothers, 3525 N. 4 St., Albuquerque, **$59,592**; 7.991 mi. Union Co., to Henry Thygesen & Co., Box 876, Albuquerque, **$66,193.** Bids 11/10. CD 10/31—ENR 11/2.

North Carolina—State Hy. & P. Wks. Comn., Raleigh, sand asphalt surfacing 5 mi. Betterment Sects. 3-7-32-6 and 3-7-28-1, New Hanover and Brunswick Counties, to F. D. Cline, Box 349, Raleigh, **$29,031.** Est. $25,000-$50,000. W. V. Baise, Raleigh, engr.

★**Pennsylvania**—Dpt. Hys., Harrisburg, Imprvs. 3.24 mi. and 4.85 mi. Lebanon Co., to Potts & Callahan Constr. Co., Inc., 500 W. 29 St., Baltimore, Md., **$472,262** and **$1,225,752** respectively. Bids 10/23 and 10/24 respectively, awarded 11/11. CD 10/25, 10/26—ENR 11/12, under LB.

Utah, Provo—City, I. G. Bench, rec., imprv. streets in Dists. 32, 33 and 34, to Enoch Smith Sons Co., 567 I St., Salt Lake City, **$37,230.** Est. $71,500. Bids 10/19. CD 9/28—ENR 10/5.

EARTHWORK, WATERWAYS

PROPOSED WORK

Minn., Redwood Falls—Redwood Co., I. R. Rogers, aud., rejected bids Sept. 29, excav., furnishing, installing clay [illegible] concrete tile, etc., County Ditch 1202, $29,[illegible]7, and County Ditch 1203, $20,783. CD 9/[illegible]—ENR 9/28.

S. D., Harrisburg—Fish & Game Comn., Pierre, repairing concrete dam and spillway, $35,000.

B. C., Victoria—Dominion Govt., Ottawa, Ont., breakwater from foot of Menzies St. to Brotchie Ledge, $75,000. Dpt. P. Wks., Ottawa, Ont., engr.

BIDS ASKED

Bids Asked December 9

†**Okla., Altus**—Bureau Reclamation, Dpt. Interior, H. W. Bashore, comr., Altus, earthworth and structures Station 0 plus 00 to Station 376 plus 87.5, Altus Canal, Altus Project, 7.5 to 14 mi. north of here, Spec. 1085.

Bids Asked December 12

†**South Dakota**—Bureau Reclamation, Dpt. Interior, W. R. Young, acting ch. engr., Denver, Colo., furnishing, del. f.o.b. cars at shipping point or f.o.b. cars at Smith's Spur, 1 welded-plate-steel outlet pipe, appurtenances for Deerfield Dam, Rapid Valley Project, Spec. 1778-D.

LOW BIDDERS

Calif., Glendale—Los Angeles Co. Flood Control Dist., 751 S. Figueroa St., Los Angeles, Oct. 31, Scholl Canyon Debris Dam and Basin in Scholl Canyon, incl. 1,110 cu. yd. excav., 9,650 cu. yd. compacted and 1,700 cu. yd. channel fill, 650 cu. yd. concrete, from R. R. Hensler, 816 Allen Ave., **$51,595.** M. E. Salsbury, 751 S. Figueroa St., Los Angeles, engr.

†**Louisiana**—U. S. Eng., U. S. Post Office & Courthouse, Vicksburg, Miss., Nov. 2, constructing approx. 209,000 cu. yd. earthwork on east bank Red River, Avoyelles Parish, from C. T. Watts, Rochdale, Miss., **$39,710.** CD 10/24—ENR 10/26.

†**Louisiana**—U. S. Eng. foot of Prytania St., New Orleans, approx. 146,000 cu. yd. earthwork, etc. on south bank Red River levees, below Moncla, Solic. No. 16-047-45-30, Avoyelles Parish, from C. T. Watts, Rochdale, Miss., **$29,054.** CD 10/17—ENR 10/19.

N. Y., Poughkeepsie—Bd. P. Wks., City Hall, Nov. 6, river intake pipe and control chamber, from Merritt-Chapman & Scott Corp., 17 Battery Pl., New York, Zone 4, **$209,063.** CD 10/17—ENR 10/19.

CONTRACTS AWARDED

†**Idaho**—U. S. Eng., 628 Pittock Block, SW 10 Ave. and Washington St., Portland, Ore., repairing, reconstructing, extens. revetments along Snake River in Heise Roberts Area, Madison Co., to Otis Williams & Co., Helena, Mont. **$37,170.** Bids 10/25. CD 9/18—ENR 9/21.

†**Tex., Port Arthur**—U. S. Eng., 25 St. and Avenue F, Galveston, dredging 2,900,000 cu. yd. materials from lower end Neches River channel, to McWilliams Dredging Co., Hibernia Bldg., New Orleans, La., 3.43c. cu. yd. Bids 10/30, awarded 11/6. CD 11/6—ENR 11/9, under LB.

†**Washington**—U. S. Eng., 800 3 Ave., Seattle, Zone 4, exploratory drilling at Boundary dam site on Pend Oreille River, Neg. 1045, to Diamond Drilling Co., 415 W. 2 Ave., Spokane, **$16,950.** Bids 11/1. CD 10/25.

LATIN AMERICA

Brazil—Republic of Brazil c/o Ministry of Agriculture, Rio de Janeiro, plans agro-industrial colony center, **Itaparica**, $150,000; plans hatcheries in Northeastern Brazil, experimental station on Rio-Sao Paulo Hy., **Rio de Janeiro**, $150,000.

Mexico—National Life Insurance Co., Ernesto J. Amescua, dir., Juarez Ave. No. 4, Mexico City, plans 5 to 7 story bldgs. in Merida, Monterrey, Torreon and Guadalajara. $2,500,000.

Mexico—National Rys. of Mexico, E. Rodriguez y Parra, engr., M.W., 19 Bolivar and 5 de Mayo Sts., Mexico, D. F., plans reconstructing right-of-way of Mexico City-Ciudad Juarez (opposite El Paso, Tex.), $1,150,000.

Mexico—State of Guerrero, Acapulco, will construct small one-room rural schools throughout state, by own forces. **$500,000.**

Mexico—State of Sinaloa, Governor Teodoro Cruz, Culiican, plans state-wide irrigation. $400,000.

Mexico—State of Chihuahua, Director of Schools, Francisco Hernandez y Hernandez, Chihuahua plans 60 schools throughout state. $1,000,000.

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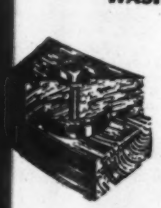

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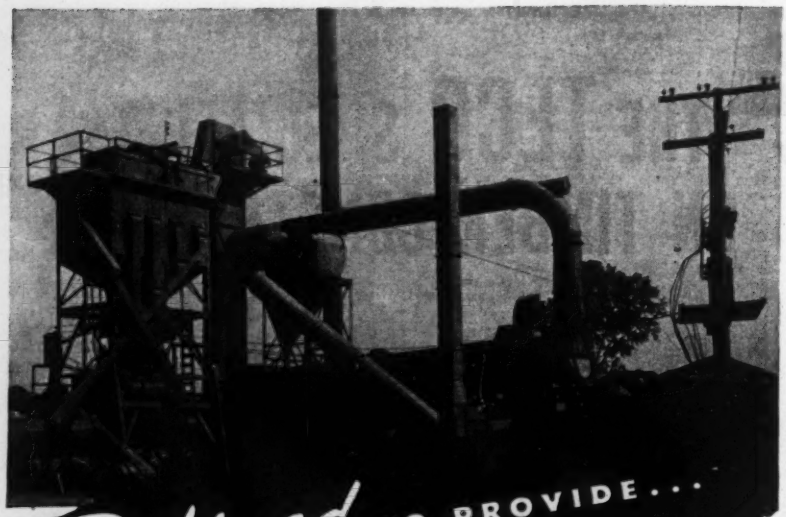

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LATIN AMERICA (Cont'd.)

Mexico, Cuernavaca—State of Morelos, Gov. Jesus Castillo Lopez, Cuernavaca, will construct spun-rayon textile plant by government workers. $700,000. CD 10/26—E3X 11/2.

Mexico, Durango—State of Durango, Governor Elpidio G. Valasquez, Durango, will construct and repair state roads by own forces. $250,000.

Mexico, Lerma—Federal Dept. of Agriculture, Sec. Marte Gomez, Presidential Palace, Mexico City, plans dam on River Lerma near here. $350,000.

Mexico, Hermosillo and Nogales—State of Sonora, Abelardo L. Rodriguez, Gov. Hermosillo, will construct and repair highway between Hermosillo and Nogales, by own workers. $350,000.

Mexico, Martinez de la Torre—Dpt. Agriculture, Presidential Palace, Mexico City, bids soon 7,000 ton sugar factory. $400,000. Approved by President Manuel Avila Camacho.

Mexico, Mazatlan—Manuel Suarez and Francisco Rivera, Mazatlan, plans packing plant. $1,400,000.

Mexico, Mazatlan—Port of Mazatlan, Director Jose Freeman, Mazatlan, takes bids early in 1945, 9 story bldg. on Avenue Olas Atlas fronting ocean to house port of Mazatlan officials, offices, etc. $1,000,000.

Mexico, Mexico City—Federal Dist., Major Rojo, Gomez, Dpt. of Federal Dist., Mexico City, will construct 25 small outdoor markets throughout federal district, by own forces. $600,000.

Mexico, Mexico City—Industria Citrica de Mexico, Madero, 6-410, Mexico, D. F., plans citric acid factory. $150,000.

Mexico, Monclova—Air Reduction Co., Inc., 60 E. 42 St., New York, N. Y., oxygen production plant. $50,000.

Mexico, Monterrey—Ladrillera Monterrey, S. A. Gante, 11-306, Mexico, D. F., plans Italian mosaics factory. $100,000.

Mexico, Monterrey — City, takes bids within 30 days, 17,000 kw. therme-electric plant. Equipment, to General Electric Co., 670 Lexington Ave., Westinghouse Electric & Mfg. Co., 40 Wall St., Babcock & Wilcox Co., 85 Liberty St., all foregoing in New York, N. Y., and to Crane Co., 47-30 29 St., Long Island City, N. Y. Est. $1,600,000.

Mexico, Monterrey—State of Nuevo Leon, Arturo B. de la Garza, gov., Monterrey, will construct and repair state roads in 1945, by own forces under direction of P. Dominguez, Road Director of State. $600,000.

Mexico, Nuevo Laredo—State of Tamaulipas, Sr. Antonio Medina Martinez, bids within 90 days, schools in Viveros and Guerra, suburbs of Nuevo Laredo. $300,000.

Mexico, Parral—City, Victoriano C. Ramos, head of local com., takes bids within 60 days, children's hospital. $200,000.

Mexico, Parral—State of Chihuahua, Governor Fernando Foglio Miramontes, Chihuahua, bids within 60 days, constructing dam recently destroyed by floods, vicinity of El Peinado. $500,000.

Mexico, San Luis Potosi—Cia. Alcoholera de Agua Bueno, Pres. Alfred Burrouchia, genl. mgr. Morris Gould, San Luis Potosi, bids in December, alcohol producing plant. $45,000.

Mexico, Tampico—Victor M. Fentanes Sanchez, Madero, 34-6-8, Mexico, D. F., plans shipyard. $1,150,000.

Mexico, Texcaltitlan—City, Gonzalo Vilchis Cano, mayor, will construct water sys. for city and surrounding small towns, by own forces. $50,000.

Mexico, Torreon—Sec. Haciaenda, Health & Agriculture, Dr. Gustava Baz, health secy., Presidential Palace, Mexico City, takes bids within 90 days, hospital for federal employees. $250,000.

PUBLIC BUILDINGS

PROPOSED WORK

†Ariz., Tucson—Tucson School Dist. 1, Pima Co., 4 classroom, etc., addn. to Mission Beach School; 7 classroom etc., addn. to Government Heights School; 6 classroom, etc., addn to El Rio School; 6 classroom, Blenman School addn.; 6 classroom, etc., school, Jefferson Park site, Ariz. 2-174-X. FWA.

★**†Calif., Los Angeles** — Western Electro Chemical Co., 2650 E. Washington Blvd., Los Angeles, addnl. plant bldgs. $1,200,000. Defense Plant Corp. will finance.

†Calif., San Francisco — Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., plans by T. F. Pfleuger, 580 Market St., 445 family dwelling units, Calif. 4896-N.

†Conn., New Haven — Public Housing Auth., NHA, 24 School St., Boston, Mass., received no bids Nov. 2, grading, site imprvs., housing Conn. 6101. J. F. Whitney, Belden Hill, Wilton, archt. CD 10/17—ENR 10/19.

†Conn., Stratford — Pub. Housing Auth., NHA, 24 School St., Boston, received no bids Oct. 31, parking areas, sidewalks, housing, Conn. 6062. Lindsay & Johnson, 211 State St., Bridgeport, archts.

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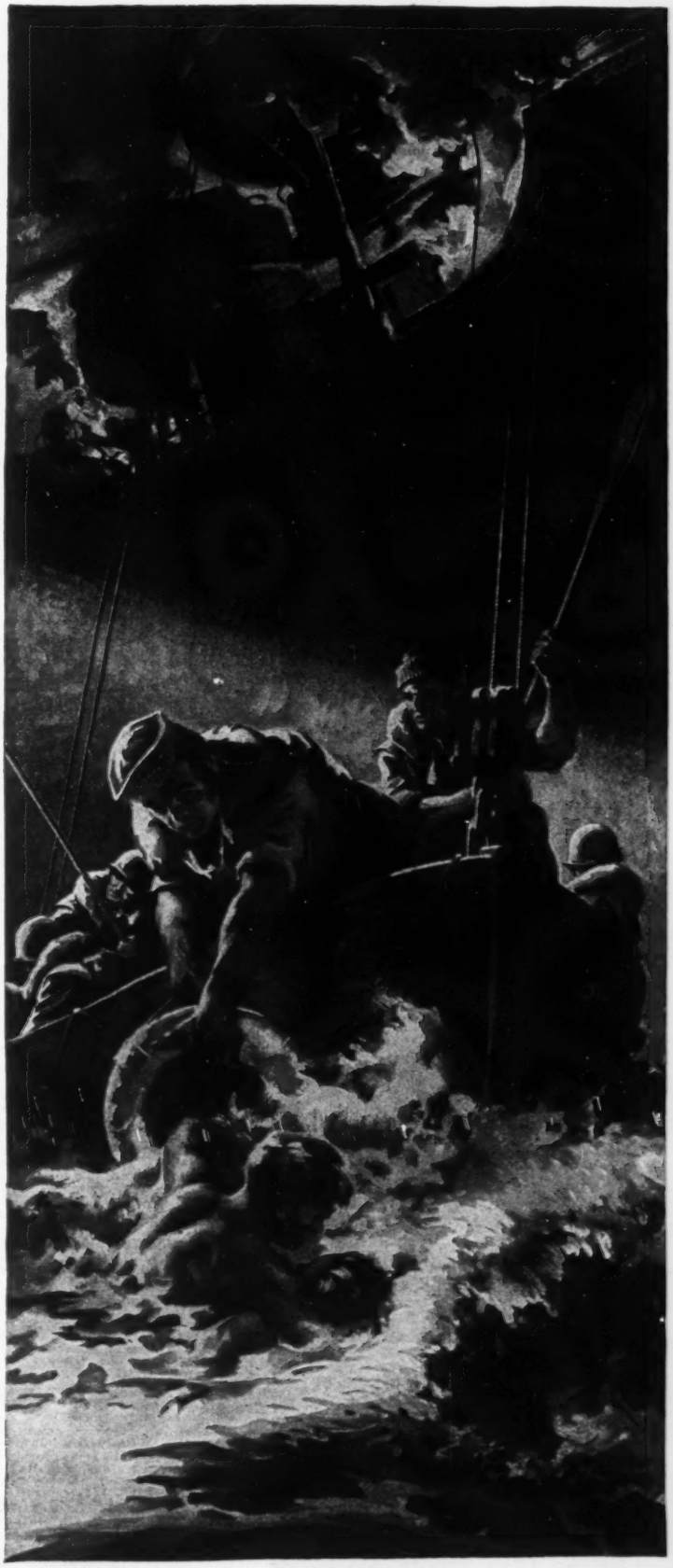

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

★†**D. C., Wash.**—Bd. Educ., District Bldg., school, D.C. 49-189. $506,000. **FWA.**

†**D. C., Wash.**—St. Elizabeth's Hospital, Congress Heights, 1 story temporary dormitory for 100 nurses, $99,000. **FWA.**

†**Fla., Lynn Haven**—Bay Co., Bd. Pub. Instruction, Panama City, 10 classroom school, Fla. 8-33-F. $93,000. **FWA.**

†**Fla., Panama City**—Bay Co. Bd. Pub. Instruction, Highland City School addn., Southport School addn., Millville School addn., Fla. 8-332-F. $60,642. **FWA.**

†**Ga., Atlanta**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., 5 story, bsmnt., 48x202 ft., nurses' home, at Grady Memorial Hospital, Ga. 9-283. **FWA.**

★**Ia., Clarinda**—City, F. H. Davidson, mayor, defeated $550,000 bonds, light and power plant sys. CD 10/20—ENR 10/26.

†**Ind., Bloomington**—Bloomington Hospital, Bd. Dir. Local Council of Women, Mrs. C. J. Sembower, pres., 640 S. Rogers St., 2 story, bsmnt., brick, stone hospital addn. $185,500. **FWA.**

†**Mich., Benton Harbor**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland 15,0., 300 family unit stop-gap housing, Mich. 20272.

†**Mich., Garden City**—School Dist., recreation facilities, Mich. 20-337-F (Revised). $88,735. **FWA.**

†**Mich., Detroit**—Allison Div. of General Motors Corp., General Motors Bldg., preparing plans 17 new test cells and addns. to 2 departments of mfg. plant. Part of $12,500,000 expansion program. Defense Plant Corp. will finance.

†**Mich., Muskegon**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland 15,0., 75 family unit stop-gap housing, Mich. 20273.

†**Mo., Normandy (St. Louis, 21 P. O.)**—St. Vincent's Sanitarium, Sister Margaret, administrator, 7300 St. Charles Rock Rd., Normandy, St. Louis, Zone 21, plans by P. M. O'Meara & Associates, 4908 Delmar Blvd., St. Louis, Zone 8, nurse's home and training school, $150,000. **FWA.**

†**Mich., Pontiac**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland 15,0., 120 family unit stop-gap housing, Mich 20270; 45 single person unit stop-gap housing, Mich. 20271.

†**Mo., Fort Leonard Wood (br. St. Louis)**—Housing Area Iimprovement Com., civilian assembly and recreation bldg., Mo. 23-311-F. $60,000. **FWA.**

†**Mo., St. Louis**—St. Mary's Infirmary, Sisters of St. Mary, 6420 Clayton Rd., Richmond Heights, St. Louis, Zone 17 bids soon 5 story, bsmnt., brick, rein.-con. nurses home, 1536 Papin St., Mo. 23-308-N. $220,800. **FWA.** P. M. O'Meara & Associates, 4908 Delmar Blvd., St. Louis, Zone 8, archts. CD 10/4—ENR 10/12.

†**Mont., Warm Springs**—Montana State Hospital, Warm Springs, plans by A. V. McIver, Strain Bldg., Great Falls, 2 story nurses' home, masonry, concrete, Mont. 24-107. $121,664. **FWA.** CD 11/8.

†**N. J., Newark** — Pub. Housing Auth., NHA, 270 Bway., New York 7, N. Y., rejected bids Aug. 25, housing, N. J. 2-9. Will readvertise. CD 8/29—ENR 8/31 under LB.

†**N. J., Trenton**—Pub. Housing Auth., NHA, 270 Bway., New York 7, N. Y., plans by Micklewright & Mountford, 242 E. Hanover St., community bldg. addn., NJ-53. CD 10/5—ENR 10/12.

★†**N. M., Eunice**—Panhandle Carbon Co., Inc., 295 Madison Ave., New York, N. Y., plant bldgs. Approx. $1,250,000. Defense Plant Corp. will finance.

†**N. Y., East Syracuse**—Cheplin Biological Laboratories, Inc., 407 W. Taylor St., Syracuse, addnl. plant bldgs. $120,000. Defense Plant Corp., will finance.

†**N. Y., Horseheads**—U. S. Eng., 120 Wall St., New York, Zone 5, making plans Italian Service unit housing. $30,000.

†**N. Y., West Point**—U. S. Eng., 120 Wall St., New York, Zone 5, bids soon winterizing barracks and mess halls, water supply sys., and altering artillery range. $35,000.

N. C., Milton—Caswell Co. Bd. Educ., c/o Supt. Public Instruction, Yanceyville, rejected bids Oct. 23, construction and mechanical installation in connection with Archibald Murphey School Bldg. Approx. $140,000. L. M. Gudger, 52 Carter St., Asheville, archt. CD 10/3—ENR 10/5.

†**N. C., Raleigh**—State Hospital, Dix Hill, 3 story, masonry and concrete addn. attendant's and nurses quarters, N. C. 31-293-N. $108,200. **FWA.**

†**N. C., Wilmington**—James Walker Memorial Hospital, J. C. Roe, chn. Bd. Mgrs., Rankin St., 2 story, hospital addn. $98,600. **FWA.** L. Boney, Murchison Bldg., archt. CD 7/19—ENR 7/27.

†**O., Dayton**—U. S. Eng., 3rd Natl. Bank Bldg., 25 x 132 ft. physiotherapy bldg. and 25 x 171 ft. dental clinic addn. $53,500.

†**O., Dayton**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, Zone 15, single person unit stop-gap housing, Ohio 333-5.

★†**Pa., Phila.**—Publicker Commercial Alcohol Co., 1429 Walnut St., feed recovery plant. $3,675,000. United Engineers & Constructors, 1401 Arch St., archts. Defense Plant Corp. will finance. CD 10/27—ENR 11/2.

†**Pa., Valley Forge (P. O. Phoenixville)**—U. S. Eng., Valley Forge, swimming pool at Valley Forge General Hospital. $100,000.

†**Tex., Beaumont** — French Independent School Dist., 5 classroom prefabricated school, Tex. 41-707-F. $1[illegible]. **FWA.**

†**Tex., Dallas**—City, City Hall, fire station, Tex. 41-700-N. $47,500. **FWA.**

†**Tex., Garland** — Garland Independent School Dist., Garland, prefabricated school consisting of 5 classrooms, [illegible], Tex. 41-703-F. $17,000. **Clarinda.**

★†**Tex., Karnack**—Monsanto Chemical Co., 1700 S. 2 St., St. Louis 4, Mo., addnl. plant on 2,000 acres adjoining Longhorn Ordnance works for Ordnance Dpt., U. S. Army. **$8,000,000.**

Tex., Port Lavaca—City, F. M. Dudgeon, mayor, City Hall, making plans 3 story, 49 x 68 ft. quick freeze plant addn., rein. con., hollow tile. Garrett Engrg. Co., 1[illegible] Milam St., Houston, engrs.

†**Utah, St. John**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, Calif., 50 family unit stop-gap housing, Utah 42193.

†**Va., Norfolk**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., engineer-architect services by Giffels & Vallet, Inc., 1000 Marquette Bldg., Detroit, Mich., one H-type ward bldg., Naval Hospital, Naval Operating Base. CD 10/5.

★**Va., Richmond**—Bd. Educ., 312 N. 9 St., plans by Carneal, Johnston & Wright, Atlantic Life Bldg., school. $500,000. Applied to FWA. CD 10/25—ENR 11/2.

†**Va., Portsmouth**—Norfolk County School Bd., 5 classroom school in Bell Mill Sect., incl. water supply and sewage disposal, relocating present frame school, Va. 44-423-N. $66,100. **FWA.**

†**Wash., Fort Stellacoom** — State, by and through Dpt. Finance, Budget & Business, nurses home at Western State Hospital, Wash. 45-317-N. $140,000. **FWA.**

†**Wash., Kennewick**—Kennewick Hospital Assn., Kennewick, plans by Naramore, Bain, Brady & Johnson, Smith Tower, Seattle, Zone 4, 1 story bsmnt. 242 x 430 ft. brick veneer hospital Wash. 45-299-F. $260,000. **FWA.** CD 10/27—ENR 11/2.

†**Wash., Moses Lake**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., rejected bids Oct. 30, altering recreation center, Wash. 45-258. **FWA.** CD 10/11—ENR 10/19.

†**Wash., Port Orchard**—Pub. Housing Auth., NHA, Skinner Bldg., Seattle, Zone 1, rejected bids Oct. 25, remodeling to provide 26 laundries at Housing 45147 and 45[illegible] May readvertise. Jones, Bouillon, Thiry & Sylliaasen, Hoge Bldg., Seattle, Zone 4, archts.

†**Wash., Vancouver**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, child care center at MacArthur School. $78,000. Seeking FWA funds.

★**Wash., Yakima** — Yakima Valley Memorial Hospital Assn., Holtzinger Bldg., 100 bed hospital. $550,000. Seeking FWA funds.

†**Wis., Milwaukee**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago 6, Ill., 270 single person unit, (use army barracks) housing, Wis. 47091.

Alta, Drumheller—Dominion Govt., c/o Ministry of Veterans Affairs, Ottawa, Ont., vocational training centre, for rehabilitation of discharged service personnel. $150,000. Dpt. P. Wks., Ottawa, Ont.

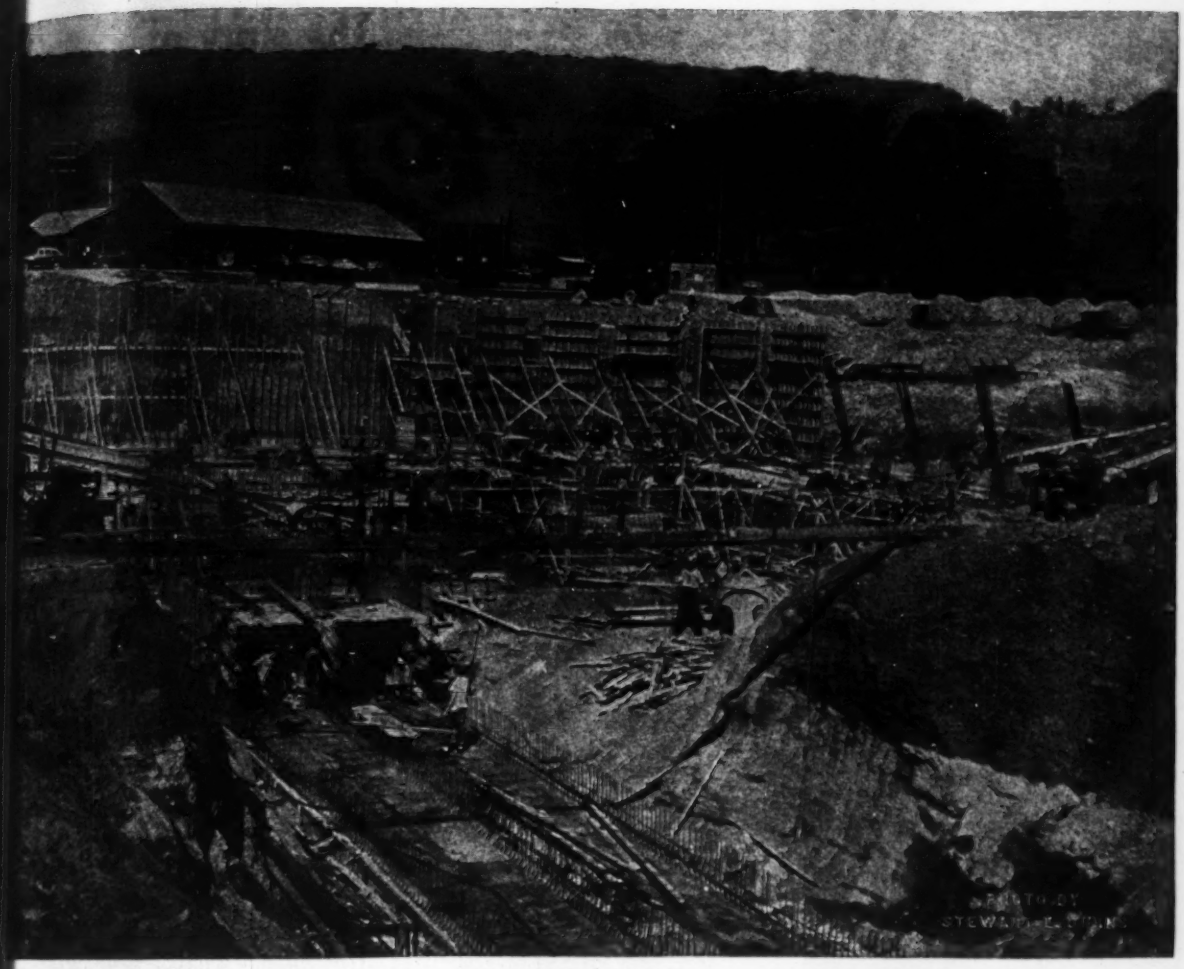
★**Alta., Edmonton**—Dpt. P. Wks., W. A. Fallow, minister, Edmonton, preparing plans 3 story, brick, tile, H-shaped nurses' home, University of Alberta Campus. $600,000.

Alta., Lethbridge—Dominion Govt., c/o Ministry of Veteran's Affairs, Ottawa, Ont., vocational training centre for rehabilitation discharged service personnel. $200,000. Dpt. P. Wks., Ottawa, Ont., engr.

Alta., Medicine Hat—Dominion Govt., Ottawa, Ont., plans by Dpt. Veterans Affairs, Ottawa, Ont., vocational training centre, for rehabilitation discharged service personnel. $150,000. Dpt. P. Wks., Ottawa, Ont., engr.

Alta., Red Deer—Dominion Govt., c/o Ministry of Veterans Affairs, Ottawa, Ont., vocational training centre for rehabilitation discharged service personnel. $150,000. Dpt. P. Wks., Ottawa, Ont., engr.

B. C., Victoria—Municipality, cottage homes and convalescent home for aged and ill citizens. $150,000.



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PUBLIC BLDGS. (Proposed Work, Cont'd.)

Man., Slave Falls (Winnipeg)—Winnipeg Hydro-Electric System, 55 Princess St., Winnipeg, power house. $158,300

N. S., Inverness—Nova Scotia Power Comn., 195 Hollis St., Halifax, power bldg., near here. $149,900.

Ont., Kitchener—Public Utilities Comn., King St., bus terminal. $100,000.

★**Ont., St. Thomas**—Municipality, 400 dwellings. $1,500,000. F. A. Bell, County Bldg., engr.

Ont., Sault Ste. Marie—Province of Ontario, c/o Dpt. Lands & Forests, Toronto, plans by E. I. Davidson, 36 Toronto St., 100 x 150 ft., slab, frame, brick, entomological laboratory, with 1 wing. $150,000.

Ont., Toronto—Greater Toronto Veterans Hospital Com., c/o Hon. W. J. Stewart, Brockville, living accommodation bldg. for next-of-kin patients at Sunnybrook Hospital. $150,000.

Ont., Toronto—School Trustees, c/o C. B. Parsons, 2786 Dufferin St., plans by C. P. Bank, 95 Woodlawn Ave., steel, brick school, concrete fdn., Dufferin St. $150,000.

★**Ont., Windsor**—Hydro Electric Power Comn. of Ontario, 620 University Ave., Toronto, bldg. and installing equip. at Essex Transformer Station. $965,000.

BIDS ASKED

Bids Asked After November 13

†**Kan., De Soto**—U. S. Eng., 909 17 St., Denver, Colo., wood framing and structural concrete work at Sunflower Ordnance Works. $150,000.

Bids Asked November 21

†**Wis., Baraboo**—Sisters of St. Mary, Baraboo, 2 story, bsmnt., L-shaped, 44 x 114 ft. and 44 x 46 ft., brick, rein.-con., tile hospital addn., St. Mary's Ringling Hospital, Wis. 47-132-N, $259,108. **FWA.** L. Sibers, 103 W. Mifflin St., Madison, archt. CD 10/6—ENR 10/12.

Bids Asked November 22

†**Mich., Farmington**—School Dist. 5 Fractional Farmington, Livonia and Redford Twps. at Board Room of School Bldg., 20210 Middlebelt Rd., 2 story school addn., 20210 Middlebelt Rd., Mich. 20-373 N. $150,000. **FWA.** Plans deposit $10. Jensen & Keough, 15875 Jas. Couzens Hy., Detroit, Zone 21, archts.

Bids Asked November 25

†**La., Houma**—U. S. Dpt. Agriculture, Div. Purchase, Sales & Traffic, 14 St. and Independence Ave. S. W., Wash. 25, D. C., cane machinery laboratory at U. S. Sugar Plant Field Station. Plans deposit $2.

Bids Asked November 27

†**Wash., Seattle**—J. Graham, archt., 1501 Dexter Horton Bldg., Zone 4, 2 story, 40 x 120 ft., rein.-con. nurse's home, with 2 story, bsmnt., 40 x 90 ft. wing, for Virginia Mason Hospital, Terry Ave. and Seneca St. $168,700. **FWA.** Plans deposit $25. CD 10/6—ENR 10/12.

Bids Asked November 27 or 28

†**D. C., Wash.**—Pub. Housing Auth., NHA, Longfellow Bldg., 1201 Connecticut Ave. N. W., Zone 25, 440 permanent apartment units and semi-detached dwellings, D. C. 1-13. Saarinen & Swanson, 2017 Eye St., N.W., archts. CD 10/6—ENR 10/12.

Bids Asked About November 29

†**Mich., Inkster**—Pub. Bldg. Admin., 18 and F Sts. N. W., Wash. 25, D. C., school, Mich. 20-364. **FWA.** Eberle M. Smith Associates, 208 Murphy Bldg., Detroit 3, Mich., archts.

†**N. C., Concord**—Cabarrus County Hospital, Concord, nurse's home, N. C. 31-207-F. $95,400. **FWA.** E. G. Flanagan, Henderson, archt. CD 9/28—ENR 10/5.

Bids Asked December 5

†**Calif., San Lorenzo**—Pub. Bldgs. Admin., 18 and F Sts., N. W., Wash. 25, D. C., Unit 1, 7 classrooms, stores, etc. at Ashland School, Unit 2, 16 standard classrooms, etc., at San Lorenzo School, Calif. 4-640-F. $224,000. **FWA.** Dragon & Schmidts, 2068 Allston Way, Berkeley, archts. CD 8/22—ENR 8/24.

Bids Asked

†**Md., Baltimore**—United Engineers & Constructors, Inc., engrs., 1401 Arch St., Phila., Pa., altering bldgs., fdns. for equip. and new equip., for United Distillers of America, Ltd., 2700 Wilmanco Ave. $250,000 incl. equip. Defense Plant Corp. will finance.

LOW BIDDERS

★†**Calif., Lynwood**—Sisters of St. Francis, c/o Geo. J. Adams, archt., 113 E. Los Feliz Rd., Glendale, Nov. 6, hospital, Calif. 4-599-N, from J. K. Thomas & Theo. Beyer Constr. Co., Chamber of Commerce Bldg., Los Angeles, **$579,447. FWA.** CD 7/12—ENR 7/20.

†**Calif., Richmond**—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, Nov. 6, fire prevention measures on 1312 dwelling units, Calif. 4176, from Biltwell Constr. Co., 4745 Geary St., San Francisco, **$182,877.** CD 10/27.

D. C., Wash.—Bd. Educ., District Bldg., Oct. 31, Adelaide Davis School, 44 St. and H Sts. S. E., from Herring & McCall, Hyattsville, Md., **$179,650.** CD 10/19—ENR 10/26.

Ind., Richmond—Bd. P. Wks., J. R. Britten, chn., City Hall, Nov. 1, municipal power and light plant, cooling towers addn., from Lillie-Hoffman Co., 6432 Cass St., Detroit, **$44,290.** CD 10/23—ENR 10/26.

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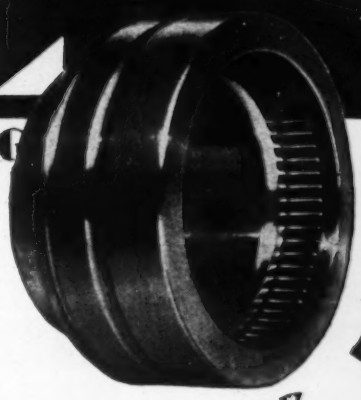

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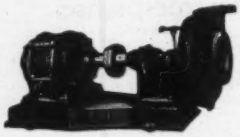

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PUBLIC BLDGS. (Low Bid ... Cont'd.)

†**N. J., Dover**—U. S. En... 120 Wall St., New York 5, N. Y., Nov. ... story, 40x8 ft., metal laboratory at P... ny Arsenal, from A. A. La Fountain, ... Beech St., Hackensack, $48,...

★†**Pa., Phila.**—Yards & D... Navy Dpt., 18 St. and Constitu... Ave., N. W., Wash., 25, D. C., dependen... hospital unit (family facilities), Naval ... spital, Spec. 10423, to R. S. Herzog, ... Race St., $574,574. Bids 11/3. CD 11/8

†**Tenn., Memphis**—Yards ... Docks, Navy Dpt., 18 St. and Constitu... Ave., N. W., Wash., 25, D. C., addnl. bldg., Naval Hospital, NOY 10990, to Consolidated Contractors, 1489 Thomas St., $201,...

†**Wash., Oak Harbor**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Zone 1, Nov. 4, 50 unit housing, Whidbey Island, Wash. 45278 N, from S. S. Mullen, 9 Ave. N. and ... St., Seattle, $158,414. CD 10/17—ENR 10/19.

†**Wash., Pasco**—Pub. Housing Auth., NHA, Skinner Bldg., Seattle, Zone 1, Nov. 7, 115 unit housing, Wash. 45279 N, from Halvorson Constr. Co. and E. H. Halvorson, 1st Natl. Bank Bldg., Salem, Ore., $348,780. CD 10/17—ENR 10/19.

Que., Huntington—Dominion Govt., c/o Ministry Munitions & Supply, Ottawa, Ont., power house, to W. G. Hunt Co. Ltd., 1405 Bishop St., Montreal. Est. $68,000.

CONTRACTS AWARDED

★†**Calif., Richmond**—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, fire-safing work for 494 dwelling units, Calif. 4416, to Bartlett & Hoskings, 541 Civic Center, $517,991. CD 10/17—ENR 10/19.

†**Calif., San Diego**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., Fleet Post Office at Naval Supply Depot, Spec. 15032, NOY 10638, to Harvey & Rose, 206 Spreckels Bldg., $97,777. Bids 10/23. CD 10/10.

†**Ill., Peoria**—St. Francis Hospital, 530 N. Glen Oak St., Oct. 31, general contract, 2 story, brick, rein.-con. nurses home, Ill. 11-200-N, from V. Jobst & Sons, Lehmann Bldg., $151,375. FWA. CD 8/18—ENR 8/24.

★†**Md., Bethesda (br. Wash., D. C.)**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N. W., Wash. 25, D. C., research bldg. annex and new animal house, Naval Medical Center, NOY 9280, to Consolidated Eng. Co., Inc., St. Paul and Franklin Sts., Baltimore, $959,000. Bids 10/25. CD 10/26—ENR 11/2 under LB.

U. S. Eng., 700 Union Guardian Bldg., Zone 31, Detroit, storage warehouses and storage areas, to Bryant & Detwiler Co., 2304 Penobscot Bldg., Detroit, $722,264.

★†**O., Sandusky**—U. S. Eng., 21 St. and Virginia Ave. N. W., Wash. 25, D. C., bldg. extens., installing residual acid lines, Plum Brook Ordnance Depot, to E. D. Badger & Sons Co., 75 Pitts St., Boston, Mass., $1,104,546. Trojan Powder Co., Hunsicker Bldg., Allentown, Pa., will operate.

†**Wis., Merrimac**—U. S. Eng., 408 Federal St., Milwaukee, furnishing 150 prefabricated bldgs. for housing, Wis. 47080, to Texas Prefabricated House & Tent Co., 160 Avery St., Dallas, Tex., $177,150. Law, Law, Potter & Nystrom, 20 S. Pinckney St., Madison, archts.

B. C., Vancouver—Wartime Housing Ltd., 55 York St., Toronto, Ont., 100 houses, to Smith Brothers & Wilson Ltd., 1267 Richards St. About $300,000.

Que., Quebec City—Workmen's Compensation Bd., 73 Grande Allee, completion office bldg., to Bergerville Immuenbles, 111 Mountain Hill, Est. $500,000. J. A. Bignonesse, 32 St. Louis St., archt.

COMMERCIAL BUILDINGS

PROPOSED WORK

Ind., Anderson — Meadowbrook Homes, Inc., W. A. Risley, pres., 3705 Main St., 75 homes, in Meadowbrook addn. $475,000. FHA.

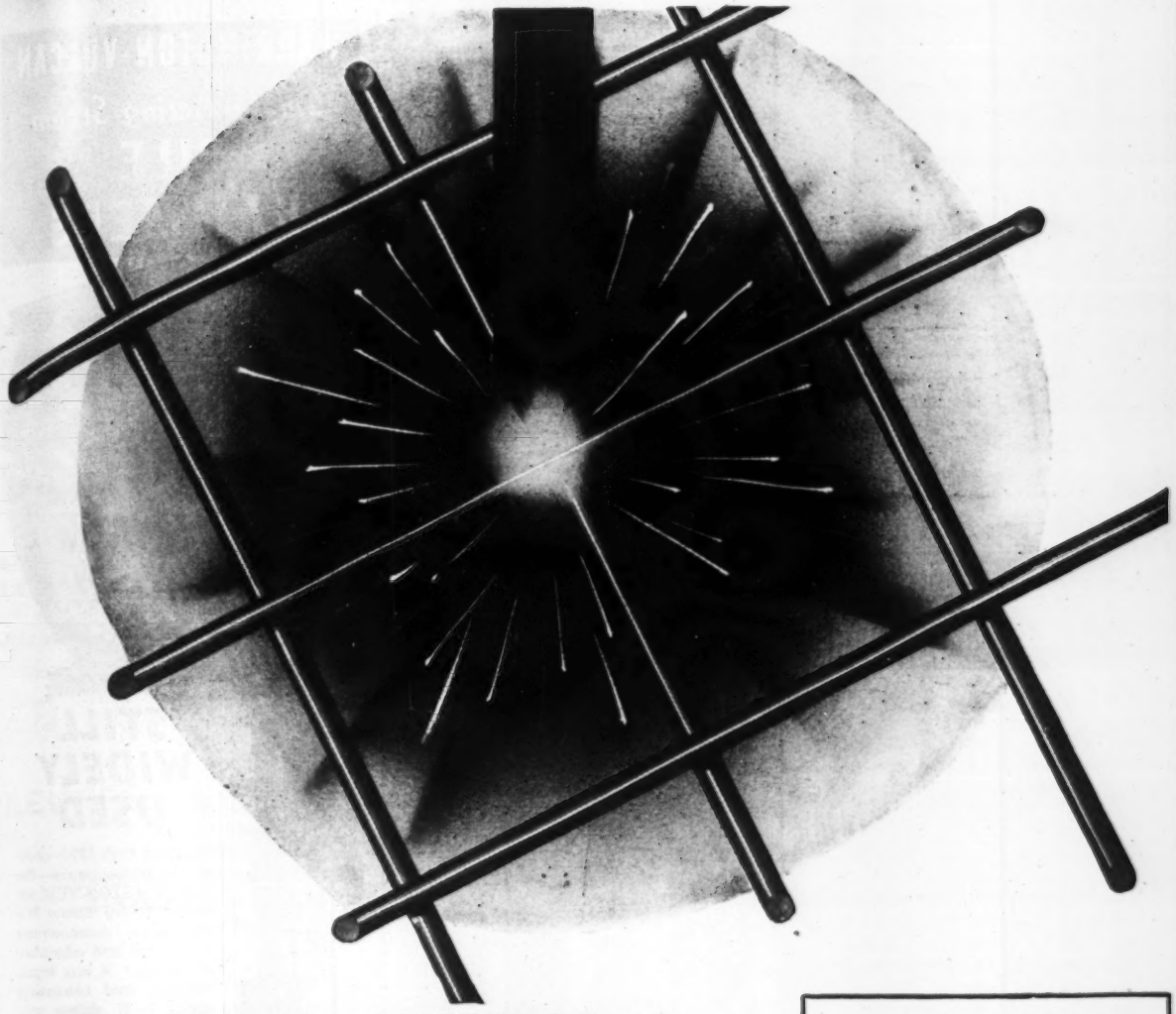
La., New Orleans—Dr. Wm. H. Gothier, Canal Bldg., plans by S. Rosenthal, Balter Bldg., hospital unit. $150,000.

La., New Orleans—Dillard University, A. W. Dent, pres., 2601 Gentilly Rd., plans by Moise M. Goldstein & Associates, American Bank Bldg., mens dormitory (primarily for men returning from overseas). $200,000.

Man., Winnipeg—Canadian Legion, Major A. M. Pratt, 609 Lombard Bldg., headquarters bldg., Memorial Blvd. $350,000.

Minn., Minneapolis—Northwestern Bible School & Evangelical Seminary, W. B. Riley, pres., 1020 Harmon Pl., 3 story, bsmnt., rein.-con., brick white stone seminary, Yale Pl. and Willow St. $250,000.

★**Mo., St. Louis**—St. Louis University, Rev. Patrick J. Holloran, S.J.; pres., 221 N. Grand Blvd., Zone 3, plans by Arthur J. Widmer & Associates, Inc., Arcade Bldg., 806 Olive St., Zone 1, wing addn. to medical school, Grand Blvd. and Vista Ave. $500,000.



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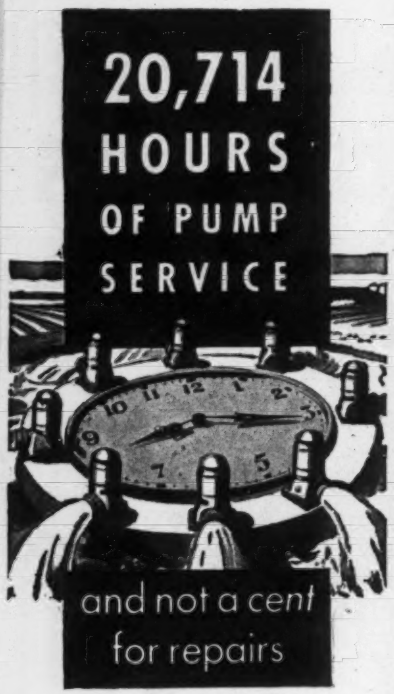

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COMMERCIAL BLDGS. (Proposed Work, Cont'd.)

N. C., Charlotte—Presbyterian Hospital, J. P. Richardson, supt., 200 Hawthorne Lane, plans by W. W. Hook, Commercial Bank Bldg., and bids soon 6 story, brick, steel hospital addn. Over $150,000.

O., Akron—Akron Jewish Center, A. Subrin, pres., 220 S. Balch St., plans by R. G. Firestone, 175 Bowery St., Jewish Center. $200,000.

O., Cleveland—Union Homes, Inc., H. R. Hamra, 335 Leader Bldg., 25 two story houses. $225,000.

Tex., Fort Stockton—Chamber of Commerce, Fort Stockton, plans by Consolidated Architects & Engineers, Fort Worth National Bank Bldg., Fort Worth, fifty 1 story, masonry type dwelling. $300,000.

B. C., Vancouver—University of British Columbia, Point Grey, Vancouver, Faculty of Forestry bldg. $150,000.

N. S., Halifax — Canadian Legion Prov. Council, 140 R Bl., rebuilding hostel for armed forces. $150,000.

Que., Joliette—La Commission Scolaire de Joliette, Z. Michaud, secy., school for girls, Notre Dame St. Over $150,000.

Que., Montreal—Precision Built Homes, Ltd., 1411 Stanley St., apartment block. $150,000.

LOW BIDDERS

Del., Wilmington—St. Elizabeth's Roman Catholic Church, Rev. J. N. Grant, pastor, Broom and Oak Sts., Oct. 31, church, from J. A. Boder & Co., Inc., 923 Market St., **$220,835.** CD 10/13—ENR 10/19.

La., Monroe—St. Francis Sanitarium, Monroe, Oct. 31, 3 story, 40 x 155 ft. school of nursing bldg., with 23 x 40 ft. wings at each end, from W. C. Salley, Monroe, **$178,934.** CD 9/27—ENR 10/5.

CONTRACTS AWARDED

N. J., Atlantic City—Knickerbocker Hotel, Tennessee Ave. and Boardwalk, repairing, altering hotel bldg., nine stores on street floor, to J. Mathis & Sons, Trust Co. Bldg., North Carolina and Atlantic Aves., **$200,000.** CD 10/23—ENR 10/26.

N. J., East Orange—J. M. and L. Const. Co., 118-57 Montauk St., St. Albans, N. Y., nine 2 and 3 story, brick, irregular sized, garden apartment bldgs., (72 units), separate contracts **$400,000.** I. Naftoli, 900 Bergen Ave., Jersey City, archt.

★ **N. J., North Arlington** (br. Arlington)—Len Home Builders, Inc., 46 Ridge Rd., seventeen 2 story, brick, masonry, 200 unit family garden apartments, separate contracts. **$2,000,000.** B. Sumner Gruzen, 921 Bergen Ave., Jersey City, archt. CD 10/17—ENR 10/19.

★ **Tex., Dallas**—Carl M. Brown & Associates, 1505 El Campo St., shopping village, Buckner and Garland Rds. Owner builds, **$2,000,000.** Hare & Hare, 114 W. 10 St., Kansas City, Mo., archts.

Tex., Monahans—J. B. Tubb, Monahans, 3 story, bamnt., concrete, steel joists, etc., hotel and store bldg., to Widmer & Mankins, Pecos, approx. **$160,000.** Haynes & Strange, Myrick Bldg., Lubbock, archts.

Tex., Pasadena—Jas. T. Taylor, First National Bank Bldg., Fort Worth, and Pasadena, community bldg. center and storage. Owner builds, **$150,000.** R. J. Bates, Esperson Bldg., Houston, archt.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ind., Elwood—PLANT—Pennsylvania R. R., J. L. Gressit, ch. engr., Broad St. Sta. Bldg., 1617 Penna Blvd., Phila. 4, Pa., and New York, Chicago & St. Louis R. R. Co., J. C. Wallace, ch. engr., Terminal Tower, Cleveland 10, O, interlocking plant at crossing of 2 lines at South C and 18 Sts., also new tracks, freight house for Penna. R. R. $60,000.

Ind., Fort Wayne—FACTORY, etc.—Wayne Paper Box & Printing Co., E. P. Ruff, pres., 102 W. Superior St., factory and warehouse addn., on 90x450 ft. site, Superior and Harrison Sts. $100,000. Site purchased.

Ia., La Porte City—PLANT—La Porte City Food Locker Co., J. R. Trunnell, mgr., La Porte City, food locker plant. $60,000.

Kan., Wichita — FACTORY — Southwest Cracker Co., 205 S. Wichita St., plans by Overend & Boucher, Brown Bldg., factory addn. $75,000.

★ **La., Baton Rouge** — PLANT — General Chemical Co., 40 Rector St., New York, N. Y., anhydrous hydrofluoric acid plant, 6,000 tons annual capacity, etc. $700,000. CD 11/1—ENR 11/9.

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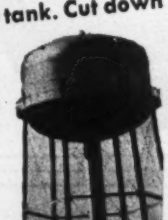

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INDUSTRIAL BLDGS. (Proposed Work Cont'd.)

Mass., North Grafton — PLANT — Wyman Gordon Co., 105 Madison St., Worcester, preparing plans 1 story, [illegible] x 400 ft., brick rein.-con. plant. J. R. Worcester & Co., 31 Milk St., Boston, engrs.

Mass., Pittsfield—PLANT—General Electric Co., Plastic Div., [illegible] Ave., soon lets contract brick, steel [illegible] office facilities. Over $40,000.

Mass., Whitinsville—MILL—Leland & Larsen, archts., 814 Statler Bldg., Boston, soon lets contract, 4 story, [illegible] x 224 ft., concrete, brick, steel mill building, for Whitin Machine Works, Main St. Over $200,000.

Mo., St. Louis — PLANT, etc. — Kayser Iron Works, J. W. Kaysing, pres., 2701 N. 25 St., Zone 7, 1 story, iron fabricating plant, 2 story, office bldg., on 97,500 sq. ft. site, Bulwer, McKissock, Humboldt and Schiller Sts. $40,000 plus with equip. to be purchased.

N. J., Belleville — MOTOR STORAGE — Bigelow Motors Co., 692 Lyons Ave., Newark, plans by F. Cook, 20 Washington St., Newark, 1 story, 100 x 100 ft., brick motor storage bldg. $45,000.

N. Y., New York—ICE PLANT—Rubin Corp., E. 156 St. and St. Ann's Ave., plans by H. Kron, 1451 Bway., Zone 18, alter. to 2 story ice plant, 110-118 Bank St. $50,000.

O., Barberton—FACTORY—Sun Rubber Co., 9 Fairview Ave., plans by R. S. Firestone, 175 W. Bowery St., Akron, rebuilding 1 story, 100 x 200 ft. factory. $50,000.

O., Cleveland—FACTORY—O'Neal Paint Products, Inc., C. E. O'Neal, pres., 1322 Madison Ave., 40 x 125 ft. paint factory, 40 x 75 ft. storage bldg., outdoor tracks. $50,000.

O., Dayton — FACTORY — Inland Mfg. Div. General Motors Corp., 2727 Inland Ave., Zone 1, soon lets contract, 1 story steel frame factory. Argonaut Realty Div. General Motor Corp., General Motor Research Bldg., Detroit, Mich., archt. CD 9/25—ENR 9/28.

O., Mansfield—FACTORY—Westinghouse —Electric & Mfg. Co., H. J. Larson, constr. mgr., Maloney Bldg., Pittsburgh, Pa., factory addn., alterations, mixing tanks and scales. $104,456.

Ore., Springfield — PLANT — Springbrook Packing Cooperative, Springfield, rebuilding 1 story cold storage plant. $90,000.

Pa., Bradford — LABORATORY — T. K. Hendryx, archt., 409 N. Craig St., Pittsburgh, or 165 Interstate Parkway, Bradford, soon lets contract top story laboratory addn., for Kendall Refining Co., S. M. Wolberg, plant engr. in charge. $45,000.

Pa., Lower Merion Twp.—LABORATORY —Sharples Corp., 23 and Westmoreland Sts., Phila., plans by E. L. Pederson, 23 Westmoreland Sts., Phila., 2 story, masonry laboratory.

Pa., West Chester — INDUSTRIAL — Schramm Inc., Virginia and Garfield Aves., plans by J. L. Ludwig, superv. archt., Farmers and Mechanics Bldg., industrial bldg. $40,000.

Pa., Worcester—PLANT—Tri County Producers Cooperative Assoc., P. E. Underkoffler, secy., Worcester, plans completed by C. M. Talley, 314 W. Broad St., Telford, egg processing plant addn. $40,000.

R. I., Cranston—PLANT—Atlantic Tubing & Rubber Co., S. Weinstein, in charge, Cranston St., plans by E. Migliori, 509 Westminster St., Providence, and bids soon, 1 story, 100 x 120 ft., brick, steel mfg. plant, concrete fdn. Over $40,000.

★**Tenn., Clarksville**—PLANT—B. F. Goodrich Co., c/o C. R. Spencer, plant mgr., Clarksville, and J. A. Scott, 500 S. Main St., Akron, O., soon lets contract 80x400 ft. factory addn. To exceed $500,000, incl. equip. Steel for above, to Virginia Bridge Co., Roanoke, Va. CD 9/21—ENR 9/28.

Tex., Brownsville—PACKING PLANT—Associated Growers of Brownsville, Brownsville, soon lets contract, 32x248 ft., rein.-con., etc., packing plant unit. $45,000.

Tex., Dallas—FACTORY—Pratt Paint & Varnish Co., 426 Factory St., soon lets contract 2 story, concrete, steel factory, over $40,000. G. Dahl, Insurance Bldg. Annex, archt.

Tex., El Campo—PLANT—American Rice Growers Assn., 7500 Washington St., Houston, rein.-con., silo type rice drying plant. Over $40,000. Central Engineering Co., 1216 Texas Ave., Houston, engrs.

★**Tex., Houston** — PLANTS — American Rice Growers Assn., 7500 Washington Sts., 19 rice drying plants, rein.-con. $75,000 each. Central Engineering Co., 1216 Texas Ave., engrs.

Tex., Houston—WAREHOUSE—Houston Natural Gas Corp., Petroleum Bldg., plans by B. P. Briscoe, 3901 Travis St., masonry steel warehouse, Lockwood Dr. $150,000.

Tex., Houston — PLANT — The Nyotex Chemical Co., Mellie Esperson Bldg., plant expansion. $485,000.

Tex., Lindale—PLANT, etc.—Lee Dingee Inc., Lindale, reconstructing vegetable canning plant and warehouse. Over $40,000.

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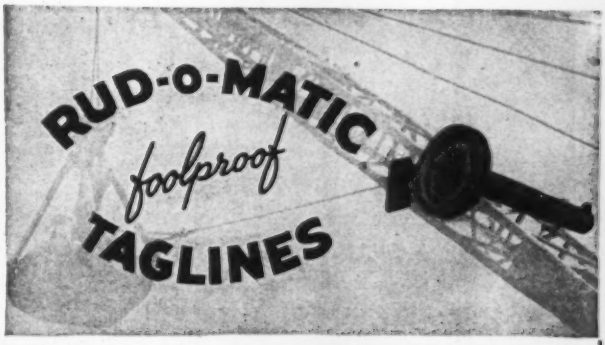

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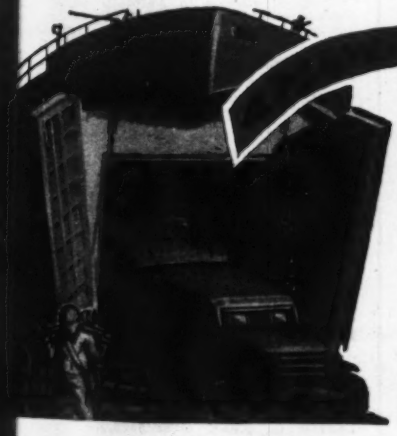

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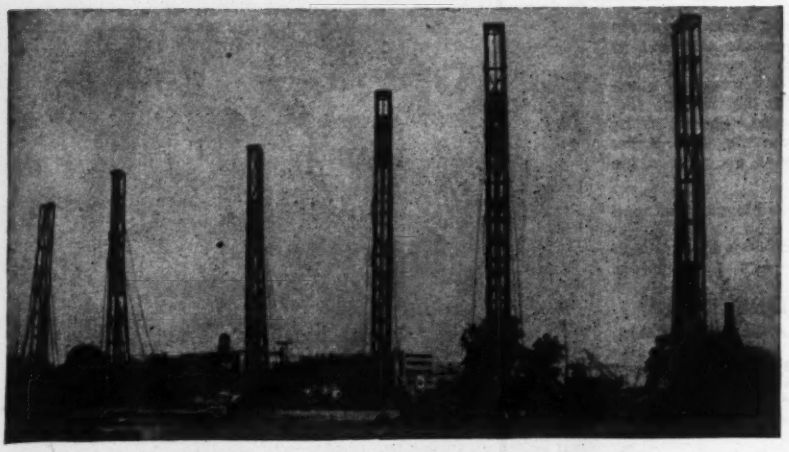

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INDUSTRIAL BLDGS. (Proposed Work Cont'd).

Tex., McAllen — WAREHOUSE — M. G. Karan, McAllen, brick, reinforced con. warehouse, $40,000.

Tex., Port Arthur — PLANT — American Rice Growers Assn., 7500 Washington St., Houston, rein.-con., silo type rice drying plant. Over $40,000. Central Engineering Co., 1210 Texas Ave., Houston, engrs.

Tex., Raymondville — PLANT — R. Allen Vegetable Co., Raymondville, 2 story vegetable packing plant, frame, sheet metal, $45,000.

Tex., San Antonio—STORAGE, etc.—Millers' Poultry & Egg Shop, 1702 Hwy., plans by B. Cocke, 1504 Milam Bldg., storage and dressing shop. W. E. Simpson Co., 1504 Milam Bldg., engr.

Tex., Sourlake—PLANT—American Rice Growers Assn., 7500 Washington St., Houston, rein.-con., silo type rice drying plant, $70,000. Central Engineering Co., 1210 Texas Ave., Houston, engrs.

Wash., Seattle — WAREHOUSE — Hydraulic Supply Mfg. Co., 7500 3 Ave. S., warehouse addn. 75,000.

Wash., Tacoma—BAKERY—Jordan Baking Co., 3623 S. 54 St., bakery, $40,000.

Wis., Ripon — FACTORY, etc. — Ripon Foods, Inc., Ripon, plans by Auler, Jensen & Brown, E. R. A. Bldg., Oshkosh, 1 story 80 x 400 ft., steel, brick, tile factory and 1 story, 50 x 80 ft., steel, brick, tile office bldg., concrete fdns.

Alta., Calgary—PIPE SHOP—Hector Machine Co. Ltd., 333 4 Ave., pipe shop, $55,000.

Alta., Calgary — WAREHOUSE — James Storage and Cartage Co. Ltd., 314 11 Ave., warehouse. $50,000.

★**Alta., Lloydminster** — DEHYDRATING PLANT, etc.—Lloydminster Refineries, Lloydminster, 1,200 bbl. daily capacity dehydrating plant, $750,000; 750 bbl. max. capacity refinery expansion, $150,000. CD 10/18—ENR 10/26.

B. C., Abbotsford—LAUNDRY—A. S. & M. Steam Laundry, Abbotsford, laundry, $40,000.

B. C. Anglemont—SAW MILL, etc.—Vokers & Charters, Anglemont, saw mill, etc. $40,000.

B. C., Coal Creek—MINING—Edmund P. Campbell, 1325 15 Ave., Vancouver, coal mining, essential bldgs. $40,000.

B. C., Kamloops—COLD STORAGE, etc.—Kamloops Ice & Cold Storage Co. Ltd., 210 Victoria St., cold storage and refrigeration plant. $50,000.

B. C., Mission City—PLANT—Fraser Valley Record Ltd., 447 Main St., job printing, lithographic engraving and publishing plant.

B. C., Pouce Coupe—GRAIN ELEVATOR—Midland & Pacific Grain Co., Ltd., Pouce Coupe, grain elevator. $50,000.

B. C., Vancouver—MILL—Western Plywoods, Ltd., John G. Bene, genl. mgr. Royal Bank Bldg., hardwood plywoods mfg. plant, North Arm of Fraser River, immediately east of Fraser Ave. $350,000. CD 9/20—ENR 9/28.

Man., Winnipeg—SLAUGHTER HOUSES—Council of Justice to Animals and Humane Slaughter Assn., London, England, slaughter houses, etc., on 160 acre site. $40,000.

N. B., Shippigan—PLANT, etc.—Western Peat Co. Ltd., Shippigan, mfg. plant and warehouse, drainage (ditch). $75,000.

N. B., Shippigan—PLANT—Farfard Peat Moss Co. Ltd., Shippigan, plant exten., etc. $50,000.

Newfoundland, Lookout Brook — POWER HOUSE—United Towns Electric Co. Ltd., St. John's, power house, $50,000.

N. S., Lakeville—PLANT—Acadia Canners Ltd., Lakeville, evaporating plant, kilns, etc.

Ont., Almonte—SLAUGHTER HOUSES—Council of Justice to Animals and Humane Slaughter Assn., London, England, slaughter houses, etc., on 200 acre site, in Hunter Twp., near here. $40,000.

Ont., Douglas—SAW MILL, etc.—Rowan Bros., Inc., Douglas, saw mill, etc. $40,000.

Ont., Kitchener—PLANT—Prack & Prack archts., 26 James St. S., Hamilton, soon let contract. Plant Bldg. 5, for B. F. Goodrich Rubber Co. of Canada, Ltd., 251 King St. W. $300,000.

Ont., Leaside—PLANT—H & H Auto Top Mfg. Co. Ltd., 18 Dunda Sq., plans by J. Thomson, 26 Queen St. E., Toronto, 1 story, 40 x 100 ft., brick plant. $45,000.

Ont., London — FACTORY—Webster Air Equipment Co., W. G. Webster, proprietor, 1161 King St., paint spraying equip. mfg. plant addn. $45,000.

Ont., Normanby—PLANT—Ayton Co-operative Assn., c/o N. E. Littt, Normanby, cereal, fruit and vegetables, etc. processing plant. $40,000.

Ont., Orillia—FACTORY—Canadian General Electric Co., Ltd., 212 W. King St., Toronto, factory. $100,000.

★**Ont., St. Thomas** — PLANT — Timken Roller Bearing Co., Inc., 1835 Dueber St., Canton, O., plant. Over $500,000.

TRIAL BLDGS. (Proposed Work, d.)

Sidney — FACTORY—Foxboro Dis- Co-operative Assn., c/o W. F. Tum- Sidney, cereal, fruit and vegetable ing factory. $40,000.

Smith Falls — FACTORY — Ber-Nel wear Ltd., c/o W. M. Dubrule, Smith factory. $40,000.

Toronto—PLANT—Art Craft Print- Ltd., 42 Lombard St., plans by J. on. 26 E. Queen St., 1 story, 30 x 100 rk. concrete printing and publishing W. King St. $40,000.

Toronto—STORAGE—Creed's Stor- d., 295 Davenport Rd., plans by H. G. 6 E. Adelaide St., cold storage plant.

Toronto—PLANT—Erie Welding Co. c/o D. B. Goodman, Federal Bldg., nist and welding plant. $40,000.

Toronto—PLANT—R. Ferguson, 149 dra Blvd., plant, Yonge St., north of ice St. $100,000.

Toronto—FACTORY—Iris Mfg. Co. c/o R. F. Wilson, 2 College St., fac- $40,000.

Toronto—PLANT—E. Lilly & Co., Terminal Bldg., plant. $50,000.

Toronto—PLANT—Rainbow Plastics c/o R. B. Burgess, 320 Bay St., plant.

Toronto — PLANT — Sunfilled Con- ted Foods Ltd., c/o T. M. Weather- 30 Bennington Hgt. Dr., food products $40,000.

Toronto — FACTORY — Tinsel Mfg. c/o J. F. Boland, 217 Bay St., factory.

Toronto—PLANT—Can. Gen. Elec. d., 212 W. King St., plans by Harwood ite, 229 Yonge St., 3 story, 88 x 130 eel, concrete plant, concrete fdn., owne Ave.

Waterloo—PLANT—Bean Printing lishing Co. Ltd., Waterloo, printing, ing, lithographing plant, etc. $50,-

Amos — MINING — Goldvue Mines Amos, surface development. $50,000. Rogers, c/o owner, engr.

Ange Gardien (Postal Dist. Quebec —PLANT—J. A. Coulombe & Co. Ltd., Gardien, plywood mfg. plant. $40,000.

Arntfield — MINING — Belle-Aura Ltd., Arntfield, bldg. for mining de- ent and extensive addnl. diamond g. $100,000.

Bourlamaque — DIAMOND DRILL- East Sullivan Mines Ltd., Bour- ue, diamond drilling programme. $150,-

Joliette—FACTORY, etc.—Canada s Ltd., St. Clair Ave., W., Toronto, F. Ducharme, local mgr., 240 St. s St., Joliette, factory and warehouse. $75,000. CD 11/7—ENR 11/9.

Montreal—FACTORY—Can. Awn- Co. Ltd., 2113 E. Ste. Catherine St., by L. Lemieux, 5623 Durocher Ave., y, 75 x 125 ft., brick factory, concrete $45,000.

Montreal—PLANT—J. Christin & Ltd., 327 Christin Pl., plans by P. M. eux, 760 Victoria Square, soft drinks plant, Sherbrooke St. E. $75,000.

Montreal — PLANT — St. Laurence s Ltd., Marieville, textile plant, enais St. $40,000.

Montreal — FACTORY — Stag Shoe Ltd., 430 McGill St., shoe factory. $50,-

Montreal—MILLS—Steel Colof Ca- Ltd., Notre Dame St. W., installing olling mills and finishing equip.

Quebec City—FACTORY—J. A. mbe & Co. Ltd., 126 St. Peter St., y. $125,000

Sorel—PLANT—General Wooden Reg., Sorel, wood working plant. 0.

Regina—PLANT—Chemical Prod- Co. Ltd., Regina, plant. exten. $40,000.

ASKED

Bids Asked November 20

Harrison—PLANT—Swift & Co., 4115 ckard St., Chicago, Ill., 1 story, steel, ated asbestos, solvent extraction bldg. 0.

Bids Asked After November 20

Rosebud—FROZEN FOOD LOCKER T—T. C. Kirksey, Rosebud, frozen locker plant. T. D. Broad, Burt Bldg., archt. P. G. Bentley, 407 Burt Bldg.,

Bids Asked

New Haven—FACTORY—A. C. Gil- Co., Peck St., 1 story, 45x165 ft., brick, cinder block factory assembly unit. Capron, 1221 Chapel St., engr.

Curryville — CREAMERY — Wm. F. Sons, engrs., 26 and Oxford Sts., ery bldg. for Abbotts Dairies, Inc., Chestnut St., Phila.

Laredo—SHOP, etc.—Texas-Mexican Co., R. W. Morrison, pres., Alamo Na- Bldg., San Antonio, expan. shop and nal yards, railway spur tracks, grounds opment, leveling, electric facilities, over $50,000; expan. mechanical repair $100,000. CD 11/2—ENR 11/9.

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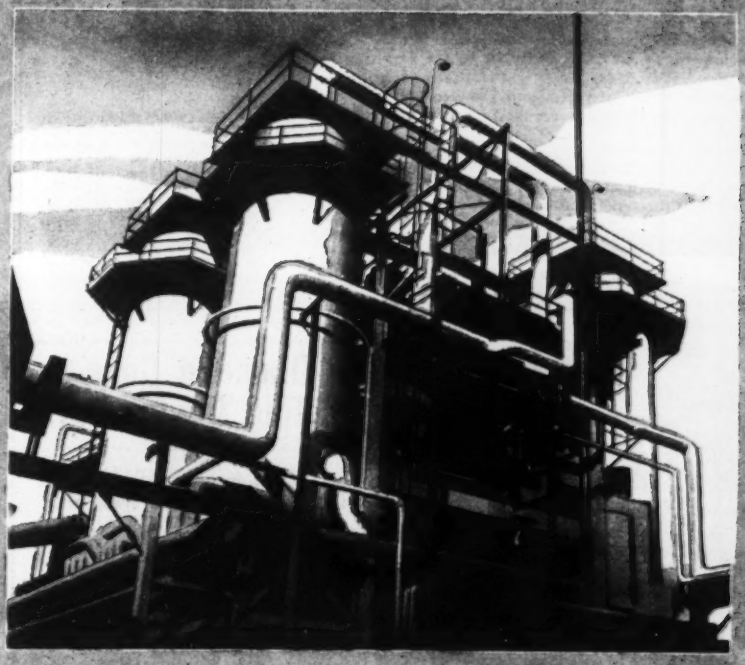

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INDUSTRIAL BLDG. (Low Bids Asked, Contracts Awarded)

Wash., Tacoma—SHOPS, etc.—Chicago, Milwaukee, St. Paul & Pacific RR. Co., Chicago, Ill., Penfield, ch. engr., Union Sta., Chicago, Ill., 2-stall shop with concrete inspection pits. $148,000. CD 9/25—ENR 9/28.

Que., Petite Riviere (Postal Dist. Quebec City)—PLANT—Co-operative de Laiterie, 1 Bagot St., Quebec City, creamerization plant and dairy products mfg. $40,000. E. Lavoie, 513 E. Rachael St., Montreal, engr.

CONTRACTS AWARDED

Calif., Anaheim—FACTORY, etc.—Calco Corp., Anaheim, 1 story, mezzanine 75 x 120 ft., steel, corrugated iron factory, and 32 x 90 ft., stucco office bldg., to Buttress & McClellan, Inc., 1013 E. 8th St., Los Angeles, approx. $50,000.

Conn., Windsorville—PLANT—Apothecaries Hall Co., 28 Benedict St., Waterbury, brick plant addn. for mfg. of fertilizer, to H. Wales Lines Co., 134 State St., Meriden. Est. $40,000.

Ill., Chicago—FACTORY—Rodine Electric Co., 2254 W. Ohio St., 2 story, 64 x 121 ft., brick factory addn., to B. J. Regnell Co., 2 W. Belmont St. Est. $60,000. N. Ronnebeck Co., 3906 N. Harlem Ave., archts.

Mass., Pittsfield—STORAGE, etc.—General Electric Co., Morningside St., 1 story, brick, steel storage and shop bldg., concrete fdn. Owner builds. $40,000.

Mich., Detroit—FACTORY—Ready Power Co., 3826 Grand River Ave., brick, steel, concrete factory addn., to Heiss Constr. Co., 14881 Artesian St. Est. approx. $50,000.

Minn., Cambridge—POWER PLANT—Rural Cooperative Power Assn., Maple Lake, brick, tile power plant, to Lenci, English & Stavn Co., Hibbing, $41,940. Bids 10/2. CD 10/25—ENR 11/2.

Mo., St. Louis—WAREHOUSE—Gerke-Allen Carton Co., 5101-13 Penrose St., Zone 15, 1 story, 113x137 ft., brick, concrete factory warehouse addn., to Kloster Co., 1 S. Grand Blvd., Zone 1. Est. $40,000 without equip. J. E. Tarling, 4114 W. Kossuth St., Zone 15, archt.

Mo., St. Louis—PLANT—Monsanto Chemical Co., 1700 S. 2 St., Zone 4, 1 story, 61 x 161 ft., brick, concrete plant addn., 134 Lafayette Ave., to Fruin Colnon Contg. Co., 502 Merchants Laclede Bldg., 408 Olive St., Zone 1. Est. $50,000. J. E. Danielson, 1700 S. 2 St., Zone 4, archt.

Mo., Springfield — FACTORY — Springfield Trailer Co., 555 Sherman Ave., brick, concrete factory bldgs., to Collins Constr. Co., 912 Baltimore Ave., Kansas City, Mo. Est. $200,000.

Mont., Billings—BUS DEPOT, SHOPS, etc.—Grayhound Stage Lines, 2605 1 Ave. N., 1 story, masonry bus depot with shops, offices, etc., to James Leck Constr. Co., 809 Metropolitan Bldg., Minneapolis, Minn. Est. $76,000. J. G. Link & Co., Electric Bldg., archt.

N. J., Hackensack — PLANT — Glucks Corp., 34 W. 14 St., New York, N. Y., 1 story, 100 x 100 ft., brick mfg. bldg., to J. J. Muscarelle, 115 Midland Ave., Garfield, $45,000. L. F. Felgrass, 575 Teaneck Rd., Ridgefield Park, archt.

N. J., Orange — PLANT — Wadell Engrg. Co., Joyce and Kirk Sts., 1 story, 150 x 250 ft., brick, steel heat treatment plant, to Weny Bros. & Storms Co., 241 Lafayette St., Paterson, $50,000. H. Gerritsen, 118 Passaic St., Garfield, archt.

N. J., Woodbridge — TUNNEL KILN — Woodbridge Sanitary Pottery Corp., 50 Green St., 13 x 265 ft., brick tunnel kiln to Allied Engineers Div. of Ferro Enamel Corp., 4150 E. 56 St., Cleveland, O., $50,000.

N. H., Rochester—FACTORY—Wyandotte Worsted Co., Main St., 2 story, 35 x 150 ft., brick factory, to William M. Bailey Co., 10 Broad St., Boston, Mass. Est. $45,000. A. R. Reed, 88 Broad St., Boston, Mass., engr.

O., Cleveland—FACTORY—American Metal Treating Co., J. L. Teegarden, pres., 1035 E. 62 St., rebuilding two 1 story, brick, steel factory bldgs., one 40 x 140 ft. and other 40 x 80 ft. and 1 story, 28 x 80 ft. office bldg., to J. L. Hunting Co., 9 and Chester Bldg. Est. $75,000. CD 10/31—ENR 11/2.

O., Warren—FACTORY — Taylor-Winfield corp., T. S. Long, genl. mgr., 1052 Mahoning Ave. N. W., 1 story, 100 x 123 ft., brick, steel factory, to Warren Engr. Co., 462 Atlantic St. Est. $65,000. CD 10/31—ENR 11/2.

Ore., Portland — FACTORY — American Linen Co., 210 W. 155 St., New York, N. Y., altering 2 story bldg. for linen supply factory, Harrison and SW 1 St., to Reimers & Jolivette, Railway Exchange Bldg. Est. $60,000. CD 9/29—ENR 10/5.

Pa., Phila.—PLANT—Yale & Towne Mfg. Co., 4530 Tacony St., 5 story, bsmnt., brick, concrete plant, to Winitz Bros. Inc., 1631 Sellers St., $50,000. Awarded 10/27. S. Harold Murphy, 4413 Frankford Ave., archt. Carson & Carson, Commercial Trust Bldg., engrs.

R. I., Cumberland—MILL—Sidney Blumenthal & Co., Inc., Meeting St., brick, concrete mill, to Henry M. Soule Co., 110 Armistice Blvd., Pawtucket. Est. over $40,000. CD 10/19—ENR 10/26.

R. I., Cranston — FACTORY — Atlantic Tubing & Rubber Co., Cranston St., 1 story, 100x120 ft., brick factory, separate contracts, $45,000. CD 11/6—ENR 11/9.

STRIAL BLDGS. (Contracts Awarded, nt'd.)

rk, Altman—PLANT—Continental Car- ne Co., Altman, design and construction n black plant, to United Engineers & r. Co., Inc., Ship Channel, Houston, and Arch St., Phila, Pa., **$1,250,000.** Awarded

, Brownsville—PLANT—Border Prod- Corp., Rio-Texas Products Co., 315 E. St., Weslaco, 2 story, brick, rein.-con. ing plant, force account, **$45,000.** CD —ENR 10/26.

, Houston — WAREHOUSE — Interna- -Great Northern R.R. Co., C. S. Kirk- k, ch. engr., Union Station, warehouse. r builds. **$40,000.** CD 9/8—ENR 9/14.

, McAllen — PACKING PLANT — hern Pacific Lines, R. W. Barnes, ch. Southern Pacific Bldg., Houston, Zone and 2 story citrus packing plant, force nt. Approx. **$40,000.**

, San Antonio—WAREHOUSE—Handy- Community Stores, Inc., 801 N. Cherry arehouse, to G. E. Myer, 1760 Division $41,165. CD 11/1—ENR 11/9.

, San Antonio—WAREHOUSE—South- Funeral Home, Wiggins & S. Flores Sts., house and mortuary, force account, 0. CD 11/2—ENR 11/9.

h, Cedar City—PLANT—Henry Kaiser na Steel Plant, Fontana, Calif., iron ore ing and loading plant, incl. ½ mi. spur ad track at Iron Springs Ore deposit, tah Constr. Co., First Sec. Bank Bldg., s. **$300,000.**

h, Cedar City—POWER PLANT— hern Utah Power Co., Cedar City, 2,500 steam power plant, to Harry E. Byer Inc., Shoreham Bldg., Wash., D. C. $300,000. CD 6/16—ENR 6/22.

, Beloit — FACTORY — C-Z Chemical 1447 Argall St., 3 story, 50 x 60 ft., factory addn., 50 x 60 ft. 2nd and tory addn. to present bldg., to Glenn Webermeier, 950 Hackett St. CD 9/19— 9/21.

, Malden Rock — CREAMERY — Lake Dairies, Inc., Pepin, 1 story, 40 x 109 brick, tile, rein.-con. creamery addn. receiving drier bldg., to Constructor 785 Eustin St., St. Paul, Minn. CD 8/23 R 8/31.

, Racine—FOUNDRY—Haas Foundry 1530 Junction Ave., 1 story, 80 x 120 ft., steel foundry addn., concrete fdn., to Fergus Const. Co., 1119 Irving Pl. J. Hammes, 1326 Clark St., archt.

, Edmonton — WAREHOUSE, etc. — h Star Oil Co. Ltd., Scott Block, Winni- Man., warehouse, garage, pumphouse office bldg., to Poole Const. Co. Ltd., Tegler Bldg., **$54,684.** CD 11/3.

t, Hamilton—POWER HOUSE—Hamil- Bridge Co. Ltd., Bay St. N., 40 x 100 ft. r house, east end of plant, Depew St., to Constr. Co. Ltd., 126 King St. E., about 0. CD 8/28—ENR 8/31.

t, Toronto—FACTORY—Can. Swift Co. 1960 St. Clair Ave., 2 story, 67 x 113 and 5 story, 30 x 60 ft. glue factory, e. brick rein.-con. fdns., to Carter r. Co., Ltd., 419 Cherry St., **$130,000.**

t, Toronto—PLANT—Garage Supply Ltd., 38 Breadalbane St., 2 story, 21x120 rein.-con., brick plant addn., rein.-con. to Maybee & Fugler, 41 Heather St. $50,000. W. S. Hall, 132 Latimer Ave.,

t, Windsor—DAIRY—Borden Co. Ltd., Monmouth Rd., 1 story, 38 x 67 ft., and ry, 38 x 58 ft., dairy bldgs., to Dinsmore- tire, Ltd., 903 Security Bldg., about 0. CD 10/13—ENR 10/19.

e, Magog—PLANT—Dom. Textile Ltd., Victoria Sq., Montreal, plant addn., al- tions, to Atlas Constr. Co. Ltd., 679 Bel- t St, Montreal. Est. **$40,000.**

e, Quebec City—GRAIN ELEVATORS, —Begimnet Frere, Reg., 142 St. Vallier 3 or 4 bldgs. incl. grain elevators, 72 x ft. warehouse, Blvd. des Capucins, to o Const. Co. Ltd., 187 de la Couronne, t $300,000. CD 8/24—ENR 8/31.

e, Ville La Salle — PAPER MILL — ding Products Ltd., 240 St. Patrick St., ral contract steel frame paper mill, 0 sq. ft. floor space on main floor and sq. ft. in basmt., incl. 60 x 40 ft. steam with boiler room, etc., to Gordon L. ton Ltd., 912 McEachran St., Montreal, 000. Entire project $365,000.

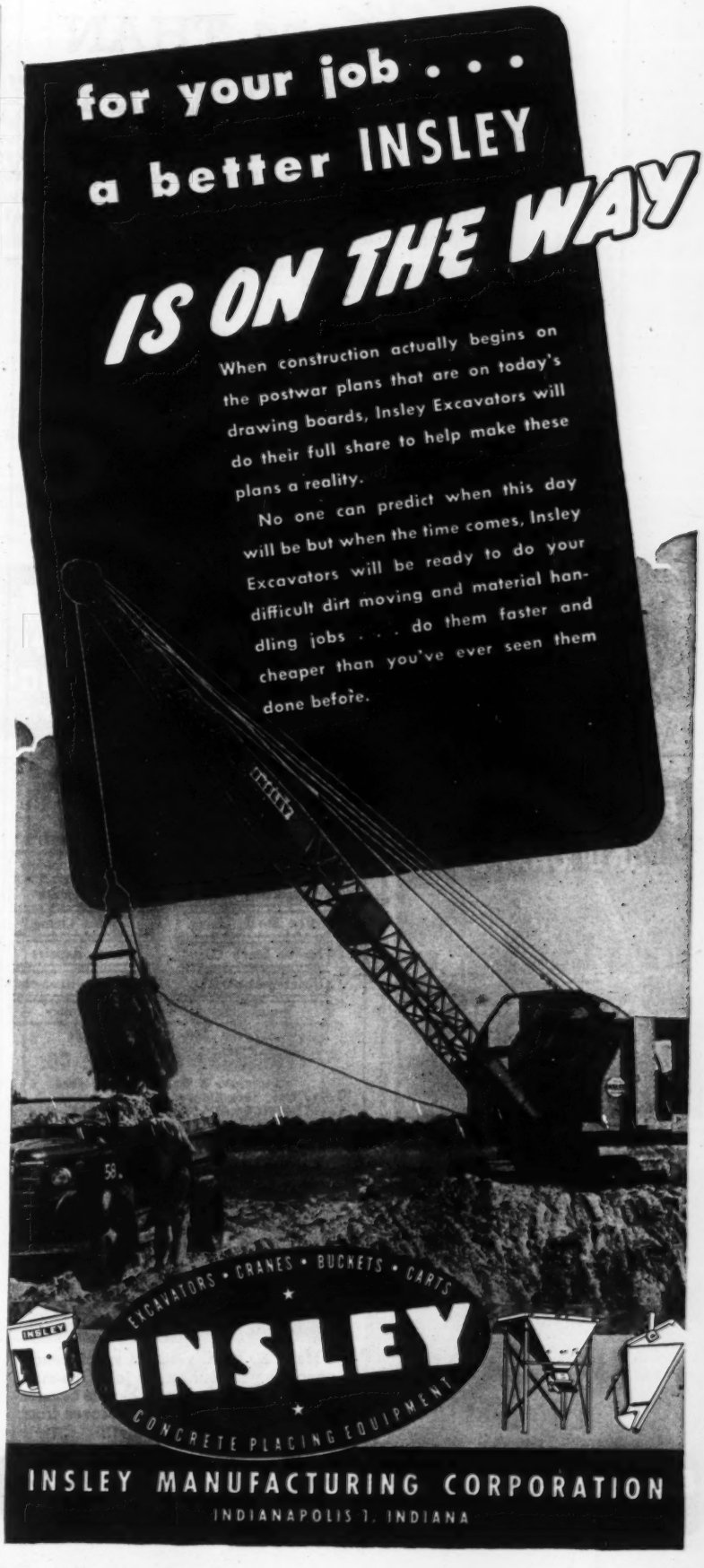
UNCLASSIFIED

POSED WORK

rkansas—RURAL ELECTRIC POWER ES—C & L Rural Electric Cooperative Star City, rural electric power trans- ion lines, Lincoln Co. $250,000. Mid- tern Engineers, Drew Bldg., Tulsa, Okla., s. CD 11/1—ENR 11/9.

Ga., Chatham—HANGARS, etc.—U. S. Eng., Post Office Bldg., Savannah, hang- miscellaneous bldgs., addnl. water sup- mains, electrical distr., sanitary sew- supply rooms, apron pavement, etc., tham Army Airfield, $1,356,000.

, Onawa — AIRPORT — City, voted 000 bonds, airport. CD 10/18—ENR. 26.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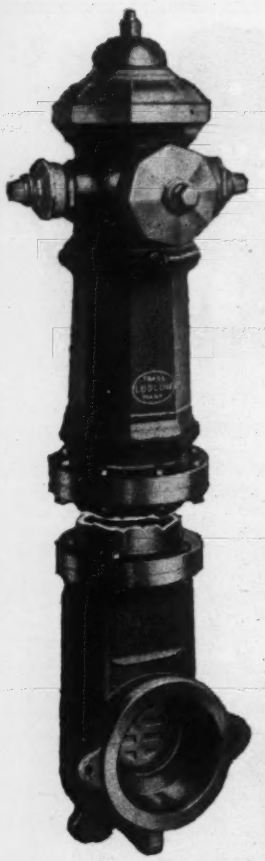

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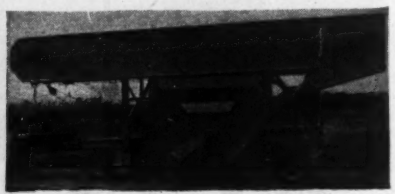

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UNCLASSIFIED (Proposed Work, Contracts)

★†**Idaho, Pocatello**—HANGARS, U. S. Eng., 628 P... Block, Sy... Ave. and Washington... Portland, hangars, crash truck... bomb ... ldgs., service aprons, ...m-up pads, rack, road, etc. $1,290,1...

Ill., Northbrook—...RK IMPR... MENTS—Village Park ... bond ... Nov. 25, park, 10 ac... for playg... recreation center and p... imprvs. $2...

★†**Ia., Sioux City**—HA...ARS, etc.—... Eng., 1709 Jackson ... Omaha, ... hangars, school bldgs., addn. ... storage, addnl. parking apron, ... pads, exten. runways, ...way, exten. ...ways, etc., Army Air B... $2,416,600.

N. J., Kearny (br. Arlington)—... BUILDING WAY—Federal Shipbuilding ... Dry Dock Co., Lincoln Hy., exten. ... building way.

★†**La., Barksdale Field** (br. Shreve...—HANGAR, etc.—U. S. Eng., 300 ... Little Rock, Ark., hangar, addnl. pa... apron, shoulders, relocating drainage, ... locating and adjusting night lighting ... $1,083,519.

★**Michigan, Kansas** and **Oklahoma**—... PIPELINE—Michigan Consolidated ... Co., 415 Clifford St., Detroit, Mich., 1,000 ... gas pipeline from Hugoton Gas Field, ... Kansas and Oklahoma to Detroit, Mi... etc. $70,000,000.

Mo., St. Louis—REHEARSAL STAGE ... Municipal Theatre Assn. of St. Louis, J. ... Lashly, pres., 1876 Arcade Bldg., rehear... stage addn. to Municipal Theatre, Fo... Park, near here, in clearing 200 ft. east ... theatre. $50,000.

†**Neb., Sidney**—FIRE WALLS—U. S. E... 909 17 St., Denver, Colo., rejected ... Oct. 27, constructing standard fire walls ... 11 type OS-1 warehouses and standard ... walls on both ends of fire walls in 10 ... WH-6 warehouses. $100,000. New p... ready Nov. 6. Government furnishes br... CD 10/31—ENR 11/2, under LB.

N. J., Belmar—PIER—Belmar Hold... Co., Ocean Ave., plans 280 ft. timber ... pier extended from present pier, ou... end to be 506 ft. channelward of mean h... water line. $50,000.

N. J., Newark—OIL STORAGE TANK... B and F Oil Co., 85 Riverside Ave., two ... 000 gal. oil storage tanks, 42 ft. diam., 4... high, rein.-con. fdns., and fire walls, ... foam spray sys. and manholes for val... and piping. $40,000.

★†**N. M., Kirtland Field** (br. Albuquer...—TAXIWAYS, etc.—U. S. Eng., ... querque, widening taxiways and provid... shoulders, access taxiways, hangars, ... parking apron, navigation trainer bld... etc. $1,260,406.

★†**N. M., Roswell**—RUNWAYS, etc.—U... Eng., Albuquerque, exten. runways ... providing shoulders, widening taxiw... incl. shoulders, widening, lengthening ... taxiway and incl. shoulders, hangar, ... Roswell Army Air Field. $1,160,917.

†**N. Y., Buffalo**—SPRINKLER SYSTEM... U. S. Eng., 120 Wall St., New York, Zone ... preparing plans, sprinkler sys. $51,000.

North Carolina — AIRPORT GRADIN... etc.—Morganton and Lenoir City Bds. ... Comrs. and Airport Com., Morganton, ... jected bids Oct. 27 grading, surfacing, ... structing protecting berm across pipe dra... ing area, at Morganton-Lenoir airport. W... readvertise. Southern Mapping & Eng. ... Greensboro, engrs.

O., Cleveland—GRANDSTAND, etc... Thistle Down Racing Assn., E. P. Stre... genl. mgr., Hollenden Hotel, rebuild ... grandstand and clubhouse at Thistle Do... Race Track. $400,000.

†**O., Cleveland**—SITE IMPROVEMENT... etc.—U. S. Eng., 17 S. High St., Colu... bus, site imprvs. of 11 acres, grading, fe... ing, lighting equip. Over $25,000.

Oregon—RURAL POWER LINES—La... Co. Electric Coop., Eugene, 100 mi. ru... power lines, Lane Co. $100,000. T. C. Smi... Corvallis, engr.

Ore., Roseburg—POWERLINE—Doug... Electric Cooperative, Roseburg, complet... 53 mi. drain power line. $100,000. R... Flora Engineering Co., Cheyenne, Wy... engrs.

Tex., Houston—MAUSOLEUM—P. Batt... stein, 2115 Wichita St., plans by Finger ... Rustay, 711 National Standard Bldg., 2... ft., Bedford limestone mausoleum in Ad... Yeshurun Cemetery. $35,000.

★†**Tex., Randolph Field**—RUNWAYS, ... —U. S. Eng., Fort Sam Houston, ex... runways and providing shoulders, widen... taxiways, providing taxiway with should... addnl. apron, hangar, etc. $2,014,172.

†**Tex., Randolph Field**—RUNWAY SHOU... DERS, etc.—U. S. Eng., Fort Sam Houst... 75 ft. width shoulders for 2 runways, 7,000 ... each, Ser. W-41-154-45-56, over $40,0... exten. parallel northwest-southeast runwa... from 5,500 to 7,000 ft., widening 4 taxiw... at each end runways, to 100 ft. widths, S... W-41-154-45-56, $150,000.

†**Tex., San Antonio**—APRONS, etc.—U... Eng., Fort Sam Houston, 240,000 sq. ... heavy-duty concrete aprons, and access ta... way with 12½ ft. shoulder, Ser. No. W-... 154-45-56. $340,000.

UNCLASSIFIED (Proposed Work, Cont'd.)

†**Va., Norfolk**—POWER DISTRIBUTION SYSTEM—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D.C., engineer-architect services by Giffels & Vallet, Inc., 1000 Marquette Bldg., Detroit, Mich., power distr. sys., Norfolk Navy Yard.

Wash., Olympia—TRANSIT SHED—Port of Olympia, G. Yantis, Port Comn. Atty. bids soon transit shed, addnl. yard trackage and pier. $100,000.

Quebec — DISTRIBUTION SYSTEM — Quebec Power Co. Ltd., 229 St. Joseph St., Quebec City, electric distr. sys. imprvs. Ste. Catherine, Lac St. Joseph and St. Augustin. $30,000.

Que., St. Jean-Baptiste de Rouville—DISTRIBUTION SYSTEM, etc.—Societe Cooperative Agricole de distribution d'electricite, St. Jean-Baptiste de Rouville, transportation and distr. sys. for electric power. $40,000.

BIDS ASKED

Bids Asked After November 13

†**S. D., Provo**—TRANSMISSION LINE—U. S. Eng., 909 17 St., Denver, Colo., 13 mi. 3-phase 6,900 volt primary circuit with transformers and secondary circuits at Black Hills Ordnance Depot. $20,000 plus.

Bids Asked After November 14

†**Tex., Gatesville**—ELECTRIC LIGHTING, etc.—U. S. Eng., Fort Sam Houston, outside electric lighting and facilities for U. S. Disciplinary Barracks, searchlights for guard towers, emergency batteries of lighting units for towers, yard and area lighting, etc., Ser. W-41-154-45-54. Over $25,000.

Bids Asked November 24

†**Calif., Hunters Point**—BRIDGE CRANES—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., bridge cranes, Naval Drydocks, Spec. 15329, NOY 10977.

Bids Asked

†**Connecticut**—DIKE REPAIRS—U. S. Eng., 231 St. James Ave., Boston, Mass. (selected list bidders), general dike repairs, No. 19-023-45-Neg-52.

O., Cleveland—PIPELINE—East Ohio Gas Co., G. Horsley, in charge, 1405 E. 6 St., placing 35,000 lin.* ft. 20 in. gas pipeline from St. Clair Ave. to Green Rd. J. F. Gray, 1405 E. 6 St., ch. engr.

Vt., Rutland — HANGAR — City, G. McLaughlin, airport comr., City Hall (selected list bidders), steel, frame hangar, municipal airport. Plans deposit $10 each set. P. R. Webber, Grove St., archt.

LOW BIDDERS

†**D. C., Anacostia**—FACILITIES—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., Nov. 6, facilities for Naval Air Intelligence Center, at Naval Air Station, NOY 11045, from J. D. Hedin Constr. Co., 820 Michigan Ave. N.W., Wash., $42,800. CD 10/16.

†**Calif., Mather Field**—HANGAR, etc.—U. S Eng., 1209 8 St., Sacramento, hangar an apron, Spec. 973, from Moore & Roberts, 693 Mission St., San Francisco, $145,356.

Calif., San Francisco—CARLINE TRACKS—Public Utilities Comn., City Hall, Oct. 31, reconstructing Market St. Railway tracks between Valencia St. and Twin Peaks Tunnels, Contr. 192, from Eaton & Smith, 715 Ocean Ave., $288,356. CD 10/20.

★†**Colo., Denver**—APRONS, etc.—U. S. Eng., 909 17 St., Denver, aprons, taxiways, etc., at Lowry Field, from Peter Kiewit Sons Co., and Big Horn Constr. Co., 1950 S. Colo. Blvd., $776,896. CD 11/8.

†**Md., Aberdeen Proving Ground**—TEST STRUCTURE, etc.—U. S. Eng., Standard Oil Bldg., Baltimore, test structure, targets, shelters and magazine, from Leimbach & Williams, 30 W. Biddle St., Baltimore. $173,472.

S. C., Pinopolis-Conway—TRANSMISSION LINE—Pub. Service Auth., 1246 Main St., Columbia, Oct. 31, transmission line, Docket 4229-P-R, from E. C. Bridges, Heath Springs, Items (1) $164,094, (2) $37,137 (3) $38,625.

†**S. D., Provo**—SPRINKLER SYSTEM—U. S. Eng., 909 17 St., Denver, Colo., Nov. 6, installing sprinkler sys. at Black Hills Ordnance Depot, Serial No. 05-016-45-16, from Raisler Corp., 129 Amsterdam Ave., New York, N. Y., $174,590.

†**Va., Langley**—TEST TOWER—Natl. Advisory Com. of Aeronautics, S. Butler, contg. agt., 1500 New Hampshire Ave. N. W., Wash. 25, D. C., Oct. 25, helicopter test tower, West Field, Docket 119(b) (1), from McClain Co., 1516 Summer St., Phila., Pa., $32,288.

†**Tex., Denton**—AIRPORT CLEARING, etc.—Civil Aeronautics Admin., P. O. Box 1689, Fort Worth, Zone 1, Nov. 2 Contr. 1, airport clearing, grading, paving, fence, conditioning, drainage, seeding, Prop. 4/45-1739, from Central Constr. Co., Monroe, La., $204,458. CD 10/26.

CONTRACTS AWARDED

†**Ala., Maxwell Field**—AIRPORT GRADING, etc.—U. S. Eng., Grant St., west of Westwood St., Mobile, grading, paving, runway drainage, to Wright Constr. Co., 504-25 Ave., Columbus, Ga., $355,481. CD 10/10—ENR 10/12.

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Start the ball rolling by appointing a **6th War Loan Bond Committee**, representing labor, management and other groups.

Carry on by selecting a **Team Captain**—preferably a returned veteran—for every 10 workers.

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Arrange frequent **Meetings of Captains**, highlighting importance of their work—effective sales methods—and need for painstaking study of Treasury Booklet, Getting The Order.

Make definite Assignments to those best equipped to arrange music, speeches, rallies, competitive progress boards and meeting schedules.

Issue Individual Pledge Cards—made out in the name of each worker and providing for both cash and installment purchase.

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NCLASSIFIED (Contracts Awarded, (Cont'd.)

Calif., McClellan Field—HANGAR—U. S. ...—1209 8 St., Sacramento, Zone 8, pre-...ricated hangar addn., Spec. 982, to H. W. ...erson, 3004 F St., Sacramento, $31,887.

Calif., Mather Field—HANGAR, etc.—U. S. ...Eng., 1209 8 St., Sacramento, hangar and ..., Spec. 973, to Trewhitt, Shields & ...ber, 1501 Pacific S.W. Bldg., Fresno, ...,209.

D. C., Anacostia — RUNWAYS, etc. — ...Yards & Docks, Navy Dpt., 18 St. and ...stitution Ave. N.W., Wash., Zone 25, ...ov. runways, taxiways and warm-up ...ons, Naval Air Station, NOY 10616, to ...C. Langenfelder & Son, 8427 New Phila-...phia Rd., Baltimore, Md., $1,348,786. CD ...1—ENR 11/9, under LB.

Colo., Tabernash — RAILROAD TRACK-...E GRADING—The Denver & Salt Lake ... Co., W. McCarthy, pres., Denver Na-...nal Bldg., Denver, Zone 2, 70,000 cu. yd. ...ding for railroad trackage, to Schmidt ...Hawkins, Box 91, Kremmling. Est. $30,000 ... or more.

Conn., Hartford—TOWER—Hartford Elec-...c Light Co., 266 Pearl St., demolishing, re-...ding Unloading Tower 3, to Merritt Chap-...n & Scott, 292 Pequot Ave., New London. ..., $50,000.

Fla., Boca Chica—AIR STATION MAGA-...NES—Yards & Docks, Navy Dpt., 18 St. ...d Constitution Av. N.W., Wash. 25, D. C., ...ganizing, Naval Auxiliary Air Station, ...OY 10715, to P. McCarl, 807 Congress Bldg., ...mi, Zone 32, $52,342.

Fla., Jacksonville—AIRPORT LIGHTING ...STEM—Yards & Docks, Navy Dpt., 18 St. ...d Constitution Ave. N.W., Wash. 25, D. C., ...port lighting sys., Naval Auxiliary Air ...tion, Cecil Field, NOY 10852, to O. V. ...tt Electric Co., Atlanta, Ga., $32,620.

Iowa — TRANSMISSION LINES — Al-...akee-Clayton Elec. Coop., Postville, 115 ... transmission lines, to Hoak Const. Co., ...42 St., Des Moines, $42,615. CD 9/20—...R 9/28.

Iowa — TRANSMISSION LINES — Hardin ...unty Rural Elec. Co-op. Eldora, 93.6 mi. ...nsmission lines, to Stewart, Inc., Cedar ...pids, approx. $58,000. Brown Eng. Co., ...ley Bank Bldg., Des Moines, engr. CD ...21—ENR 10/26.

Mass., Fitchburg—PARK DEVELOPMENT ...Whalon Park Assn., H. Bowen, in charge, ...in St., rebuilding amusement bldgs., ...halon Park. Owner builds. Est. $45,000. ...kley, Bradley & Day, 508 3 Ave., Pitts-...rgh, Pa., archts. CD 8/14—ENR 8/17.

Md., Aberdeen Proving Ground—PILL ...XES—U. S. Eng., Standard Oil Bldg., ...ltimore, pill boxes to Ritter Bros., 1511 ... Cameron St., Harrisburg, Pa., $165,300.

Montana—RAIL LINE IMPROVEMENT—...est Northern Ry. Co., C. M. Nye., ch. ...gr., 175 E. 4 St., St. Paul, Minn., imprv. ...l line between Acme and Collins, to Mor-...n-Knudsen Co., Box 450, Boise, Idaho. ..., $115,000.

Mo., St. Louis—RUNWAY REPAIRS—...y, M. M. Kinsey, pres., Bd. P. Serv., 304 ...y Hall, Zone 3, repairing, resurfacing ...prox. 1,950 lin. ft. old Runway 1 and for ...airing, rebuilding approx. 450 ft. Run-...y 3-6 at Lambert-St. Louis Municipal ...rport, to Bridges Asphalt Paving Co., ...11 Central Industrial Dr., Zone 10, $42,-...

N. J., Atlantic City—AIR CONDITION-...G SYSTEM — U. S. Eng., Penn-Mutual ...dg., 6 and Walnut Sts., Phila., Pa., instal-... air conditioning sys. for military bldg., ... Bowers Bros. Co., 2015 Sansom St., ...la., Pa., $31,976.

N. J., Bayonne—EXTERIOR UTILITIES ...Yards & Docks, Navy Dpt., 18 St. and ...stitution Ave. N.W., Wash. 25, D. C., ...terior utilities, N S O T C, Bayonne Annex ...y Yard, NOY 10874, to August Arace & ...s, Inc., 642 3 Ave., Elizabeth, $103,007.

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"CLEVELANDS" built-in adaptability to meet the many varied field conditions enable them to handle the toughest ditching jobs on the roughest going and in the tightest spots.

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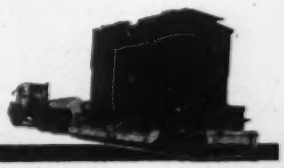

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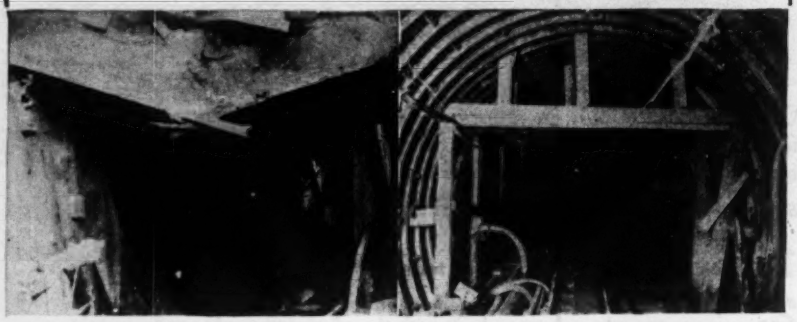

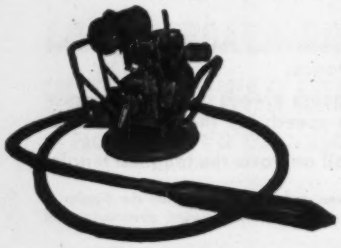

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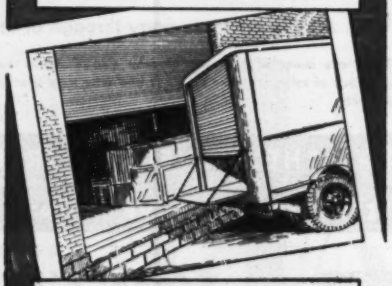

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†N. J., Earle—SLOPE PROTECTION, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., cinder protection of slopes, bituminous-treated sideways army intransit area, N[illegible] Ammunition Depot, NOY 10971, to U[illegible] Co. & Charles J. Hesse, Inc., [illegible] W. 14 St., New York, N. Y., **$85,240.**

†N. J., Newark—HANGAR—[illegible] Eng., 120 Wall St., New York 5, N. Y., [illegible] Bldg. 112 addn., Army Air Base, to [illegible] A. Goodman, 315 E. 32 St., New York, N. Y., **$36,800.** CD 10/23—ENR 10/26.

†N. J., Wildwood—TREE [illegible]EARING—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., tree clearing 347 acres, Naval Air Station, NOY 10120, to T. G. Whitmyer, Folsom, **$18,370.**

†N. Y., Lido Beach—BEACH IMPROVEMENTS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., repairing storm damage, Naval Training Center, NOY 11041, to William L. Crow Constr. Co., 101 Park Ave., New York, **$70,000.**

†N. C., Cherry Point (br. New Bern)—AIR STATION BLDG.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, sales commissary addn. at Marine Corps Air Station, Spec. 15025, NOY 10840, to F. N. Thompson, Lawyers Bldg., Raleigh, **$26,234.** Bids 10/26.

★ **†O., Aultman**—AIRPORT—Civil Areonautics Admin., 608 S. Dearborn St., Chicago, Ill., airport, incl. grading, clearing 2,000,000 cu. yd. drainage work, three 150 x 5,600 ft. runways, taxiways, aprons, Canton-Akron Memorial Airport, Summit and Stark Counties, to Lewis & Frisinger Co., E. B. Schwaderer Co. and Julius Porath & Son, Ann Arbor, Mich., **$1,675,534.** Bids 4/1. CD 4/10—ENR 4/12 under LB.

Oklahoma—RURAL ELECTRIC LINES—East Central Oklahoma Electric Cooperative, Okmulgee, 120 mi. rural electric power transmission lines in Muskogee, Okmulgee, Tulsa, McIntosh, Cherokee and Wagoner Counties, to Electric Constr. Co., 317 Main St., Little Rock, Ark., **$85,500.** Southwestern Eng. & Const. Co., Drew Bldg., Tulsa, engrs. CD 10/18—ENR 10/26.

†R. I., Quonset Point — AIR STATION BLDG., etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., paint and oil storage bldg. exten., paving adjacent area, Naval Air Station, NOY 10954, to Frankini Constr. Co., 30 Mystic Ave., Medford, Mass., **$43,400.** Bids 10/26. CD 10/19.

Texas—RAILWAY LINE—Texas-Mexican Ry. Co., R. W. Morrison, pres., Alamo National Bldg., San Antonio, building dumps, widening roadbed, grading, filling 118 mi. railway line between Laredo and Corpus Christi, and providing crushed stone roadbed topping and laying 75 lb. steel rails on 118 mi. main railway line between Laredo and Corpus Christi, to H. B. Zachry Co., Box 596, San Antonio, **$175,000** and **$275,000** respectively. Est. $150,000 and $375,000 respectively. CD 11/2—ENR 11/9.

†Tex., Abilene—NIGHT LIGHT SYSTEM—U. S. Eng., Fort Sam Houston, permanent electric outside night lighting sys., Ser. W-41-154-45-40, to Empire Electric Co., 1011 13 W. Rosedale St., Fort Worth, **$41,618.** CD 10/19.

Tex., Alice — PIPELINE CARRIER — Sun Pipe Line Co., Nixon Bldg., Corpus Christi, 30 mi. 6 and 8 in. crude oil pipeline carrier, vicinity of here, to Allied Welding & Engineering Co., Alice, **$89,000.** CD 11/2—ENR 11/9.

†Tex., Biggs Field (br. El Paso)—RANGE—U. S. Eng., 4 and Gold Sts., Albuquerque, N. M., shooting range, to J. E. Morgan & Sons, 210 N. Campbell St., El Paso, approx. **$25,000.**

Tex., Electra—STORAGE TANKS—Waggoner Refining Co., Electra, reconstructing 8 gasoline steel storage tanks, own forces. **$70,000.** CD 11/2—ENR 11/9.

†Tex., Fort Worth—GASOLINE SERVICE FACILITIES, etc.—U. S. Eng., 231 W. Main St., Denison, gasoline service and solvent storage facilities, at Convair, to J. Walton, 1900 E. Lancaster St. **$31,721.**

†Tex Georgetown—CLEARING etc.—U. S. Eng., Fort Sam Houston, clearing, grubbing, fencing, Ser. W-41-154-45-43, to A. L. Bucy, Brownwood **$25,000.**

†Tex., Lubbock — AIRFIELD IMPROVEMENTS—U. S. Eng., Albuquerque, N. M., airfield imprvs., to Plains Constr. Co., Pampa, **$27,105.**

†Wash., Manchester — GASOLINE STORAGE TANK REPAIRS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., repairing and relining 3 underground prestressed concrete gasoline storage tanks, NFD, Middle and Orchard Points, NOY 10830, to Watson & Morris, 4137 Dunsmuir Ave., Oakland 2, Calif. Est. **$37,500.**

Ont., Kirkland Lake—DOCK—Temiskaming & Northern Ontario Ry. Comm., S. B. Clement, ch. engr., North Bay, dock, Temagami, near here, day labor. **$50,000.**

Ont., Oakville—PIER REPAIRS—Dpt. P. Wks., Ottawa, pier repairs, to Russell Const. Co. Ltd., 501 Harbour Commission Bldg., Toronto, about **$33,000.**

Proposal Advertisements see p. 213 and 214
Postwar Projects see p. 146

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